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# EVENING DIVISION
# BULLETIN 1968-1969

## NEW HAVEN COLLEGE

WEST HAVEN, CONNECTICUT

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# *NEW HAVEN COLLEGE*

## EVENING CREDIT AND EXTENSION DIVISION BULLETIN

## 1968-1969

New Haven College, 300 Orange Avenue, West Haven, Conn. 06516

# Evening Credit Division Calendar

## SUMMER SESSION 1968

| | | 1968 |
|---|---|---|
| Registration period | Tuesday-Wednesday | June 4-5 |
| Tuition due on or before | Wednesday | June 5 |
| First Term classes begin | Monday | June 17 |
| Holiday (Independence Day) | Thursday, Friday | July 4-5 |
| First Term final examinations | Wednesday | July 24 |
| Second Term classes begin | Thursday | July 25 |
| Second Term final examinations | Thursday | August 29 |

## FALL SEMESTER 1968

| | | |
|---|---|---|
| Registration for current and former students | Monday-Friday | August 19-30 |
| Holiday (Labor Day) | Monday | September 2 |
| Registration for new students | Wednesday-Thursday | September 4-5 |
| Tuition due on or before | Friday | September 6 |
| Classes begin | Thursday | September 12 |
| Holiday (Thanksgiving) | Thursday-Friday | November 28-29 |
| Christmas recess | Saturday-Sunday | December 21-January 5 |
| | | 1969 |
| Classes resume | Monday | January 6 |
| Last evening of classes | Friday | January 10 |
| Final examinations | Monday-Friday | January 13-17 |
| Recess | Saturday-Sunday | January 18-26 |

## SPRING SEMESTER 1969

| | | |
|---|---|---|
| Registration for current and former students | Monday-Friday | January 6-17 |
| Registration for new students | Tuesday-Wednesday | January 21-22 |
| Tuition due on or before | Wednesday | January 22 |
| Classes begin | Monday | January 27 |
| Spring recess | Saturday-Sunday | March 29-April 6 |
| Classes resume | Monday | April 7 |
| Last evening of classes | Friday | May 16 |
| Final examinations | Monday-Friday | May 19-23 |
| Commencement | Sunday | June 15 |

## SUMMER SESSION 1969

| | | |
|---|---|---|
| Registration period | Tuesday-Wednesday | June 3-4 |
| Tuition due on or before | Wednesday | June 4 |
| Classes begin | Monday | June 16 |
| Holiday (Independence Day) | Friday | July 4 |
| First Term final examinations | Monday | July 21 |
| Second Term classes begin | Wednesday | July 23 |
| Second Term final examinations | Wednesday | August 27 |

* Placement examinations are given at regular intervals. A schedule is available.

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# THE BOARD OF GOVERNORS

Roland M. Bixler, *Chairman*
President, J-B-T Instruments, Inc.

Stuart W. Finlay, *Vice Chairman*
Shearson, Hammill & Co., Inc.

Bulkeley Smith, *Secretary*
Formerly, President, Manufacturers
Division, New Haven Chamber of
Commerce

Frederick F. Fischer, *Treasurer*
Certified Public Accountant

Hubert C. Hodge, *Assistant Secretary*
President, American Buckle Co.

Harold G. Anderson
Supervisor, The Southern Connecticut
Gas Co.

James Q. Bensen
Resident Manager, Bethlehem Steel Corp.

Norman I. Botwinik
President, Botwinik Brothers, Inc.

Richard H. Bowerman
Partner, Tyler, Cooper, Grant,
Bowerman and Keefe

Milton P. Bradley
Formerly, Senior Vice President
The First New Haven National Bank

Mrs. Kingman Brewster, Jr.

William G. Cleaver
Formerly, Senior Vice President
The First New Haven National Bank

Peter H. Comstock
President, Pratt, Read & Co., Inc.

William J. Cooper
Chairman of the Board and Chief
Executive Officer, The United
Illuminating Co.

Abbott H. Davis, Jr.
Vice President—Public Relations, The
Southern New England Telephone Co.

Robert B. Dodds
President, Safety Electrical Equipment Co.

John E. Echlin
Chairman of the Board
Echlin Manufacturing Co.

Robert M. Gordon
President, The Milford Rivet &
Machine Co.

Harley J. Hiscock
President, The FMR Corporation

John C. Ireland
Commercial Sales Representative
The United Illuminating Co.

Richard C. Maconi
President, Maconi Construction Co.

Howard W. Maschmeier
General Manager, WNHC-TV

Ellis C. Maxcy
Formerly President, The Southern
New England Telephone Co.

Robert I. Metcalf
Formerly, Vice President—Public Affairs
Olin Mathieson Chemical Corp.

John Perry Miller
Dean of the Graduate School
Yale University

George I. Mordecai
President of the Alumni Association

Marvin K. Peterson
President of the College

J. Coy Reid
Chairman of the Board and Chief
Executive Officer, The First New
Haven National Bank

Mrs. Gloria Schaffer
State Senator

Leon J. Talalay
General Manager, B. F. Goodrich
Sponge Products Division

Mrs. F. Morgan Taylor, Jr.

George R. Tiernan
State's Attorney, New Haven County

Felix Zweig
Professor of Enginering and
Applied Science, Yale University

# ADMINISTRATION

| | |
|---|---|
| Marvin K. Peterson, B.S. in Econ., M.Ed. | *President* |
| Allen C. Hutchinson, A.B., M.A., Ph.D. | *Vice President* |
| John Collinson, A.B., A.M., Ph.D. | *Dean, School of Arts and Sciences* |
| Hugh N. Emerson, A.B., M.B.A., Ph.D. | *Dean, School of Business Administration* |
| Thomas C. Warner, Jr., M.E., M.S. | *Dean, School of Engineering* |
| George A. Schaefer, B.S., M.B.A. | *Dean of Continuing Education* |
| Richard M. Lipp, B.S. | *Assistant to the Dean of Continuing Education* |

# New Haven College

●

## History

New Haven College is a private, coeducational, independent, urban college founded by the Y.M.C.A. of New Haven in 1920 as a branch of Northeastern University. The College has held for its primary function service to the individual student as well as to business, industry, and institutions of the New Haven area. It has a strong sense of responsibility to the community.

By act of the Connecticut General Assembly, the College was incorporated in 1926 and was authorized to grant the Associate in Science degree. At the same time, an agreement was negotiated with Yale University for the use of classrooms and laboratories for the operation of an evening division. During the years which followed, the College, in cooperation with local business and industry, developed and conducted a systematic educational program.

From 1941 to 1945, the College administered the official Yale University Engineering, Science, Management, War Training Program for New Haven County. Accreditation of its Associate in Science degree programs in 1948 by the New England Association of Colleges and Secondary Schools marked another significant step forward. The next decade saw the inauguration of the Division of Special Studies, the School of Executive Development, and the Reading Center. During this period two daytime programs for recent high school graduates were also begun: the Cooperative Plan, in which students alternated terms of work and study, and the Engineering Program.

Since 1958 New Haven College has been authorized by the Connecticut General Assembly to offer courses of study leading to the Bachelor of Science degree to both day and evening students. The acquisition of the present campus in 1960 provided an opportunity for the College to expand its offerings for full-time students and to develop further its other credit and non-credit curricula. In March, 1962, the College acquired an additional 28 acres of undeveloped land three blocks north of the present campus, which will be the site of the new dormitories to be available for use in 1969. Also under consideration for this area are new athletic facilities, including playing fields and a field house.

In December, 1966, the College received accreditation of its Bachelor degree programs by the New England Association of Colleges and Secondary Schools. The attainment of full accreditation, a major step forward, has further helped the College to pursue its principal objectives: to provide leaders and professional personnel within the framework of our democracy, to produce well-educated citizens with an understanding of important cultural and scientific progress, and to encourage students to reach the maximum of their potential.

# Divisions of the College

New Haven College has three administrative divisions: the Day Credit Division, the Division of Continuing Education, and the School of Executive Development. Included in the Division of Continuing Education are the Evening Credit Program, the Extension Credit Programs, the Summer School, the Division of Special Studies, and the Reading Center. All divisions of the College are coeducational.

## Credit Programs

**Day** The degree-granting Day Division offers curricula which lead to the four-year Bachelor degree and the two-year Associate degree.

Students pursuing a course of studies leading to a Bachelor of Science degree in Business Administration may elect a major in Accounting, Economics, General Management, Operations Management (including Computer Concentration), Marketing, or Public and Social Administration. Law Enforcement, with majors in Administration or Science, is an option under Public and Social Administration.

Students pursuing a course of studies leading to a Bachelor of Science degree in Engineering may elect a major in Electrical Engineering, Industrial Engineering, or Mechanical Engineering.

Students pursuing a course of studies leading to a Bachelor of Arts degree may elect a major in Chemistry, Economics, English, History, Mathematics, or Physics. By taking a modified program in either Chemistry or Physics the student may receive a Bachelor of Science degree. A student may also elect to pursue an interdisciplinary course of study leading to a Bachelor of Arts degree in American Studies.

An Associate in Science degree may be obtained in Business Administration, Engineering, or Arts and Sciences.

Students pursuing a course of studies leading to an Associate in Science degree in Arts and Sciences may elect a major in General Studies, Biology, Commercial and Advertising Art, or Journalism.

**Evening** The degree-granting Evening Division offers curricula which lead to a Bachelor of Science, a Bachelor of Arts, or an Associate in Science degree.

A Bachelor of Science degree is offered in the following areas: Business Administration with majors in Accounting, General Management, Operations Management including Computer Concentration, Marketing, Public and Social Administration, Economics, Electrical Engineering, Industrial Engineering, Mechanical Engineering. Law Enforcement, with majors in Administration or Science, is an option under Public and Social Administration.

A Bachelor of Arts degree may be obtained in the following majors: Chemistry, Economics, English, and History.

An Associate in Science degree is offered in the following areas: General Studies; Accounting; Business Administration; Engineering with a major in General, Electrical, Industrial, Mechanical, or Metallurgical Engineering; and Police Science and Administration.

## Extension Programs

A particular function of an urban college is to organize and develop programs of study which will serve the more specific needs of area industries and organizations. New Haven College has undertaken these programs as the need was recognized. They may take the form of off-campus extension programs with classes being held in training classrooms of specific companies or at the Engineering Extension Division at Groton, Connecticut, or the work may be done on the College campus. Current program offerings include:

**Law Enforcement Programs** The dramatic changes in the nature and scope of the problems confronting society in various areas of law enforcement require equally important adjustments in the approach to solving them. Highly educated people in all the fields of law enforcement have become a necessity.

The basic program leading to the Associate in Science degree prepares students to be proficient and competent in the many aspects of police work. It offers professional and cultural courses at the college level for careers in private or public law enforcement.

The Bachelor of Science degree programs, in either Administration or Science, require the associate degree program as a base. They supply the specialized courses for careers in their respective areas as well as the regular liberal arts studies.

**Groton Extension Division** This Engineering Program leads to a Bachelor of Science Degree in Mechanical or Industrial Engineering. The majority of courses are taught in the New London area, but it is recognized that certain laboratory courses must be taught on campus at New Haven College or Yale University. Matriculation into this program presumes the completion of the first two years of an engineering program or its equivalent.

**YMCA Professional Courses** For many years, the College has administered courses for YMCA professional people. These are taught at the New Haven YMCA.

## The Division of Special Studies

This Division offers a series of special courses in engineering, business and general areas. Usually students taking these courses do not receive academic credits. The courses ordinarily are designed to provide supplemental knowledge and skills needed in specialized jobs in business and industry. Further information about the Division may be obtained by requesting separate bulletins from the College.

## The School of Executive Development

This four-year program for middle-level executives consists of advanced studies in the field of management, with emphasis placed on the development of the student's breadth and understanding outside the area of his or her specialization. The School is guided by a group of senior executives of New Haven area businesses and industries. Its enrollment is limited to individuals designated by their respective companies and approved by the College. The program is offered in the late afternoon hours. Additional information about it may be obtained from the College upon request.

### The Reading Center

It is the aim of the New Haven College Reading Center to offer a varied program of reading techniques and study skills to fit the specific needs of students and adults. The curriculum is designed for classroom group teaching techniques on the secondary, college, and adult levels. In-plant management training programs can be arranged. Additional information may be obtained from the Director of the Reading Center.

### Accreditations and Memberships

New Haven College is a coeducational, non-sectarian, independent institution of higher learning chartered by the Legislature of the State of Connecticut and accredited by the Connecticut State Department of Education as a junior and senior College. The College holds membership in the New England Association of Colleges and Secondary Schools and the Connecticut Conference of Independent Colleges, and is also a member of New England and national educational and professional organizations.

The New England Association of Colleges and Secondary Schools accredits schools and colleges in the six New England States. Membership in one of the six regional accrediting associations in the United States indicates that the school or college has been carefully evaluated and found to meet standards agreed upon by qualified educators.

## Evening and Extension Credit Divisions

GEORGE A. SCHAEFER, Dean

### Aims and Objectives

The College believes that work is good educational experience, but it is improved when related to academic instruction. This means that a student's work and scholastic program should be integrated as far as possible. By such integration the traditional barrier between the academic and the practical may be broken down.

In accordance with this viewpoint, the College encourages and assists its students to seek employment related to their degree programs or to pursue courses of study related to their work. The relationship between work and study necessarily varies, of course, but becomes increasingly important after the first year of study. The placement activity of the College is designed to implement the idea of an integrated program of work and study.

### Schedule of Hours and Subject Load

All courses, except laboratory courses, offered in the Evening Credit Program are scheduled to meet from 7:00 to 9:45 P. M. The College is operated Monday through Friday.

A student may carry as few as three semester hours or as many as ten, depending on his wishes. The same academic standards are required of the student regardless of the number of credits he carries.

## Admission

Since each program of the College has its own admission requirements, these requirements are defined in detail in subsequent pages of this catalog.

In general, graduates of accredited secondary schools are eligible for admission. However, in special cases persons who have not completed their high school education may be admitted to the various divisions of New Haven College by meeting certain specified conditions.

In the case of adults, the College is interested in evidence of maturity and motivation as well as in formal education as prerequisites for admission.

With the exception of "auditors," students wishing to take any course, whether or not they seek a degree, must satisfy the admission requirements.

## Classification of Students

There are three classifications of students in the Evening Credit Programs:

*Degree Student* The degree student indicates on his registration that he is undertaking to complete the requirements for the A.S. degree or B.S. degree in one of the Evening Credit Programs. He must satisfy all the admission requirements and be a fully matriculated student.

*Non-Degree Student* The non-degree student is one who does not intend to meet all the requirements for a degree, but who wishes to select certain subjects which are offered as a part of the degree requirements. Although not seeking a degree, the non-degree student must satisfy all admission requirements in the same way as the degree student, thus making it possible for him to become a degree candidate at any later registration simply by so indicating on his registration. Although the student is not a candidate for a degree, he must be fully matriculated.

*Auditor* The classification of auditor is assigned to persons who wish merely to attend class and listen to the discussion. Since they are not required to meet any of the admission requirements, they are not privileged to participate in discussion, nor to have tests and examinations graded by the instructor; they are not subject to attendance regulations, and are not granted credit.

## Admission of Students from Secondary Schools

**Requirements** The following regulations apply to the admission of students from secondary schools.

The applicant should be a graduate of an approved secondary school or should possess a state high school diploma.* In some cases, an adult who has completed at least two years of secondary school with satisfactory record may be considered, provided he performs exceptionally well on the placement examinations which are required. The admission of such an adult will be tentative for one year, during which time he must pass the state examinations for the state high school diploma. No person will be considered who has not completed at least two years of secondary school. The quality of the secondary school record, especially of the academic subjects it contains, is given greater consideration than is the specific pattern of courses taken in secondary school.

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* Information regarding the examinations for the state high school diploma may be obtained from the Director of Admissions, or by writing to the Bureau of Youth Services, State Department of Education, State Office Building, Hartford, Connecticut 06103.

Applicants from secondary schools are required to take admission tests, including Scholastic Aptitude, Mechanics of English, Reading Comprehension, and Mathematics. College Entrance Examination Board results, if satisfactory, are accepted in place of the New Haven College admission examinations.

## Admission of Students Transferring from Other Colleges

**Requirements** Transfer students who present evidence of completion of at least thirty semester hours of study at an accredited college with a grade of "C" or better may be admitted on the basis of an official transcript and will not be required to take the Scholastic Aptitude Examination.

For the purpose of determining placement, the following examinations are required as indicated below:

The Mechanics of English Examination and the Reading Comprehension Examination are required unless the transcript shows the completion of at least three semester hours of college English with a grade of "C" or better.

The Mathematics Examination is required, unless waived by the Mathematics Department, for those students whose programs require mathematics.

Placement in courses as a result of the above examinations will be on the same basis as for applicants from secondary schools.

Transfer students who do not have the required thirty semester hours of work as noted above, or who have been dismissed for academic deficiency, are required to take the Scholastic Aptitude Examination in addition to the other placement examinations which are applicable, as described above. Students who have been dismissed for academic deficiency will be considered only after the lapse of one semester.

Transfer students who are not certain of the quality of their previous work are advised to take all entrance examinations lest their transcripts be delayed or be of an unacceptable quality.

**Advanced Standing** Transfer credit from other colleges will be officially granted upon the successful completion of 12 semester hours at New Haven College.

Transfer students who wish to fulfill the requirements for any degree (Associate or Bachelor) at New Haven College must complete the last thirty semester hours of the program at this College. Also, for Associate degrees twelve semester hours must be in the field of specialization, and for Bachelor degrees eighteen semester hours must be in the field of specialization.

## Application Procedures

Those interested in seeking admission should call or write the College and arrange for a personal interview with a staff member. At the time of the interview the applicant will complete a Personal Data Form and will plan his program. Interviews may be scheduled during college office hours at the convenience of the applicant.

When the student decides to seek admission, he pays the application fee and arranges for the procurement of necessary transcripts.

Following application, the College requests the secondary school record of the applicant. Applicants who wish to present college transcripts, either for admission purposes or for advanced standing, must themselves request their college transcripts be sent to the College. The College provides a form for this purpose.

The applicant next takes such placement examinations as are required of him and is notified in writing of his acceptance or rejection, and of the subjects he will be required to take as a result of his performance on the placement examinations.

During the registration period he fills out the registration forms, indicating the courses he wants, and pays the tuition charges.

## Transferability of Credit

In accordance with the usual practice among institutions of higher learning, transfer of credit from this College to another institution will be determined by the other institution in terms of the achievement and promise of the individual seeking transfer. The institution to which transfer is being made will also evaluate specific courses in terms of their length and content in relation to its specific requirements. New Haven College is an accredited institution and its credits will be given consideration by the major institutions of the country in terms of the conditions outlined above.

## Student Personnel Services

**Counseling and Guidance** The College maintains counseling and guidance officers on its staff. Staff and faculty also reserve many hours for counseling with students. Appointments for this purpose should be made at the Evening Reception Office.

**Placement Service** An evening placement service office is maintained by the College. Although the College does not conceive its function to be that of a public employment service, it is interested in and prepared to render placement service within the limitations of its purpose and resources.

A student or former student of the College who desires placement should call at the office for a placement application form and at that time will receive specific information as to whom he is to contact in regard to his placement problem.

A company wishing to use the placement facilities of the College should list the position and the desired qualifications in the form of a letter. A member of the College staff will then contact the company to discuss procedure and possibilities of filling the position.

**Financial Aid and Scholarships** Various types of financial aid are available at the College. A limited number of partial tuition grants in aid are available during the Fall and Spring semesters. Criteria are need and scholastic standing. Various organizations make available each year a limited number of academic scholarships. For further information contact the Evening Director or the Director of Financial Aid.

## The Evening Student Council

Membership in the Evening Student Council is open to all evening credit students who have successfully completed one full semester. Nominations and elections by secret ballot are conducted in the spring of each year. Council meetings open to all evening credit students are held monthly.

The Council has three primary objectives:

To unite the evening students to promote the welfare of the evening student body of the College.

To give counsel and encouragement to all evening students of the College and to develop a school spirit among them.

To convey evening student opinion to the administration and to work with the officers of the College to accomplish student objectives.

*Fraternities* In 1965, an Evening Fraternity, Kappa Omega Epsilon, was formed. The constitution of the Fraternity indicates its functions to be the promotion of fellowship without racial, religious or social barriers; to promote scholarship by setting an example of high scholastic achievement; to support athletic programs; and to perpetuate mature leadership. Students interested in more information are invited to write care of the Evening Division Office.

*Student Publications include:* The News, the all-college newspaper edited and published by the student group; The Chariot, the annual yearbook; and the Student Handbook. Any student may volunteer his services on any of the student publications.

## Library

The Library contains more than 45,000 catalogued volumes in an open-shelf arrangement, with facilities for study and browsing. Subscriptions to approximately 475 periodicals and extensive back-issue files are maintained. There are also a pamphlet collection and rapidly growing microfilm files. These materials, while strongest in the specific areas of study in the college curriculum, cover all fields.

The resources of the Free Public Library of New Haven (380,000 volumes) and of the West Haven Public Library (79,000 volumes) are available to all students of the College. For those who are not residents of the respective communities, there is a nominal borrower's charge, although anyone may use without charge materials within the building of these libraries.

## Alumni Association

Membership in the Alumni Association is acquired immediately upon graduation from either the associate or the bachelor program. A member of the administrative staff of the College serves as Director of Alumni Relations. An Executive Committee conducts the affairs of the Association during the periods between annual meetings and also serves as a planning group. There is a standing committee on annual giving.

In addition to the annual meeting, other meetings of social and educational interest occur during the year, and a quarterly publication, the *Alumni News,* is mailed without charge to each alumnus.

The Alumni Association is represented on The Board of Governors by the election of a member to the Board for a term of two years. The president of the Association serves on The Board of Governors as an ex-officio member.

## Scholastic Regulations

**Grading System** The following grading system is in use and, except where otherwise specified, applies both to examinations and to term work. The weight of a final examination grade is a matter individually determined by each instructor. A—Superior, B—Good, C—Fair, D—Lowest passing grade, F—Failure.

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|---|---|
| Inc. | Incomplete. Indicates that some work remains to be completed. Such work must be made up within six months in order to remove the "incomplete." Otherwise, the "Inc." remains on the student's record, no credit is given for the course and it must be repeated before further work for which it is prerequisite may be taken. |
| WD | Withdrawal. Indicates either: (1) Withdrawal prior to midpoint of semester, or (2) withdrawal after midpoint of semester and work satisfactory at that time. |
| WF | Indicates withdrawal after midpoint of semester with unsatisfactory work. |
| S | Satisfactory. Given only in non-credit courses. |
| U | Unsatisfactory. Given only in non-credit courses. |

**Grade Reports** Reports of the final grade in each subject will be mailed to the student soon after the close of each semester. The same report will be mailed to employers in those instances where the student has given his approval. Reports will be mailed to parents or guardians of all students under 21.

**Academic Standards** The academic standing of each student will be determined on the basis of his quality point ratio each semester.

During each semester of enrollment in the College, a quality point ratio of 1.5 is required.

Failure to earn the required quality point ratio in any semester will place a student on academic probation for the following semester of enrollment.

A student is automatically dismissed when he receives a third probation, or when his quality point ratio for any one semester is less than 1.00.

Attention is called to the fact that the minimum quality point ratio of 1.5 which is required to remain in good academic standing from semester to semester is insufficient to meet the graduation requirement of a total quality point ratio of 2.0. Therefore, the fact that a student may never have been on probation is no guarantee that he will meet graduation requirements.

In order to determine quality point ratios, each letter grade is assigned a quality point value: A—4 quality points, B—3 quality points, C—2 quality points, D—1 quality point, F—0 quality points.

The quality point ratio for all credit students is obtained by multiplying the quality point value of each grade by the number of semester hours of the course, then dividing the total quality points by the total semester hours.

**Readmission** Application for readmission after a student has been dismissed will be considered only after the lapse of a semester and only when the student provides evidence which indicates his probable success if readmitted.

Requests for readmission should be submitted in writing to the Dean of Continuing Education at least three weeks before the opening of the semester and should include evidence supporting the student's belief that he will succeed if readmitted.

Readmission does not automatically follow; each application is decided individually by the Committee on Academic Standing.

**Dean's List** Evening students who have accumulated a minimum of 14 semester hours at the College will automatically be considered for the Dean's List at the end of each semester. A cumulative quality point ratio of 3.20 or better is required.

### Withdrawal—Evening Division

*From College* Students are required to discuss their intentions with the Director of the Evening Division before withdrawing from the College.

*From a Program* Students considering a change in program should first discuss the matter with the Department Chairman of the proposed new program. If it is agreed that the change is advisable, written permission will be granted. Forms for making a change are provided at the Evening Reception Desk.

*From a Course* Forms are provided at the Evening Reception Desk.

## Requirements for the Degrees

The Associate and Bachelor degrees will be conferred at Commencement when the student has met *all* the requirements of his program and:

1. has earned a cumulative quality point ratio of at least 2.0;
2. has been recommended by the faculty;
3. has met all financial obligations.

## Associate in Science Degree with Honors

A degree *with Honors* is awarded to students who have a quality point ratio of 3.25 for the semester hours specifically required for the degree program from which they are being graduated, and who have taken all the required work at this College.

Transfer students will be awarded honors on the same basis, provided however, that their total average will be considered only when they have an honor average for studies completed at this College.

A degree *With High Honors* is awarded to students who have a quality point ratio of 3.50 based on the same considerations as noted above.

In determining eligibility for degrees with honors, credits earned by crediting examinations and electives in excess of those required will not be considered.

## Bachelor of Science Degree with Honors

Honors may be conferred upon candidates for graduation who have completed at least 60 semester hours of work at New Haven College in their junior and senior years. The following standards shall be used:

1. The Bachelor degree *Cum Laude* may be awarded to a student whose cumulative quality point ratio is at least 3.25 at the end of the first semester of his senior year and who continues to attain the same standard for the remainder of the year.
2. The Bachelor degree *Magna Cum Laude* may be awarded to a student whose cumulative quality point ratio is at least 3.50 at the end of the first semester of his senior year, who continues to attain the same standard for the remainder of the year, whose quality point ratio in all courses counting toward his major is at least 3.50, and who has completed all the suggested courses within his curriculum.
3. The Bachelor degree *Summa Cum Laude* may be awarded to a student whose cumulative quality point ratio is at least 3.70 at the end of the first semester of his senior year, who continues to attain the same standard for the remainder of the year, whose quality point ratio in all courses counting toward his major is at least 3.70, and who has completed all the suggested courses within his curriculum.

## Advanced Study

Advanced study courses are offered for qualified students in the departments offering the degree of Bachelor of Science or Bachelor of Arts. These courses may include a thesis, tutorial work, or independent study which permits the students to work intensively in areas of special interest.

## Registration

**Degree and Non-Degree Students** There are two parts to registration: the completion of the registration forms and the payment of tuition. Both should be completed before the closing date of registration as stated in the calendar. There is a penalty fee for delaying either of these two processes beyond the closing date of registration.

Registration is possible within office hours during the registration dates stated in the calendar.

Registering for new students must be in person at the College office. Currently enrolled evening students may register by mail. Forms are mailed to the student prior to the announced registration dates.

A separate registration is required for each of the semesters and for the summer session.

Auditors follow the same procedure and pay the same fees as credit students.

### Changes of Registration and Schedules

Students are urged to plan their programs carefully before completing the registration forms in order to avoid the need for requesting changes. Once the registration period has ended, the student is charged the Change of Registration Fee for each change which he makes. The fee is payable when the student completes the form requesting the change.

### Course Revisions

The College reserves the right to change, delete, or add courses, without notice, as circumstances may require.

### Attendance Regulations

Classes are operated on the policy that it is necessary for all students to attend all class meetings. If a class is missed, the benefits from participation in the class discussion and instruction are completely lost. No student, regardless of ability, can afford that loss.

A student is allowed only two absences per semester for a 3-or-4 semester hour course. If the student is absent more than twice, permission to continue in the course must be obtained from the instructor.

## The Summer Sessions

The College offers summer sessions in both the Day and Evening Divisions with these primary functions:

To provide an opportunity for study to students of the area who attend other schools during the regular academic year. For financial reasons, most of these students find it desirable to live at home and work while attending summer school.

To offer an opportunity to present and prospective students of New Haven College to attend summer classes.

The usual reasons for attending summer sessions include making up deficiencies, satisfying prerequisites for advanced courses, and acquiring advanced standing.

Students in either credit division at New Haven College may attend either day or evening sessions in the summer. Those looking forward to entering college may use summer classes to satisfy entrance requirements.

Some 80 other institutions have authorized their students to take courses here and transfer their credits. Prior approval by the parent school is necessary to insure transfer credit. The College is a member of the New England Association of Colleges and Secondary Schools.

**Registration** For all new students a personal interview with a staff member of the College is necessary. Registration procedures will be explained at this time. For those new students who desire work for credit in other institutions, prior approval should be obtained from those institutions. This procedure should be followed each semester regardless of previous attendance.

## Tuition and Fees

**Evening Division:** Regular Academic Year

| | |
|---|---|
| Application fee—payable only once at the initial time of application. Not refundable | $10.00 |
| Tuition—per credit hour or equivalent<br>This includes Student Activity Fee which covers subscription to College newspaper, use of Student Center, and helps to defray cost of all student activities and facilities. | 30.00 |
| Change of registration—assessed for changing courses or sections after the completion of registration | 5.00 |

**Summer Terms**

For information regarding both Day and Evening summer sessions, request the Summer School Bulletin.

**Other Charges**

| | |
|---|---|
| Late registration—assessed for failure to complete registration and/or payment of fees before closing date of registration. Not refundable | 5.00 |
| Laboratory and Breakage fees—payable each semester by students registering for courses requiring the laboratory fee. See Course Description for specific amounts. Not refundable. | |
| Make-up Examination—assessed when a student is permitted to take an end-of-semester examination at other than the scheduled time except for conflicts caused by the examination schedule | 5.00 |
| Make-up Test—assessed when a student is permitted to make up an announced test during the semester | 3.00 |
| Auditors—the fee for a student auditor in any course or courses is the same as if the courses were taken for credit. | |
| Graduation fee—assessed regardless of participation in exercises and due before March 1st of year of graduation. Not refundable | 25.00 |
| Transcript of academic work—no charge for the first one; thereafter, per copy | 1.00 |

**Payment of Bills**

Tuition, fees, and other college charges are payable at time of registration. Payment made by check or money order should be made payable to New Haven College.

A deferred payment plan is available to all full-time students and to all part-time students carrying 6 or more credit hours or the equivalent. Details of this plan are available at the Business Office.

Summer Terms: Because of the short duration of the summer terms, the total amount due for tuition and fees is due and payable at time of registration for each term.

### Failure to Pay

The College withholds the giving of grades, the issuance of transcripts, and the granting of honorable dismissal to any student whose account is in arrears.

### Refund of Tuition

Registration does not carry with it the right of a refund of tuition in cases of withdrawal. No deduction is made for temporary absence from classes, nor is any refund made if a student is suspended or dismissed.

Requests for withdrawal should be made in person through the Evening Office. If this is not possible, a letter requesting withdrawal must be sent to the Director, Evening Credit Division. Telephone requests cannot be honored.

Tuition only is refunded or cancelled by one of two methods upon receipt of formal withdrawal request:

1. Percentage basis for any reason before or during the first four weeks of the semester—

    80% of semester tuition before or during first week
    60% of semester tuition during second week
    40% of semester tuition during third week
    20% of semester tuition during fourth week
    None after fourth week

2. Pro-rata basis of tuition involving:
    (a) death or protracted illness of student
    (b) involuntary induction into military service
    (c) transfer or change in work initiated by employer that precludes meeting class schedules

    All requests for refunds under this method must be documented.

Summer session students—In cases of withdrawal from a course or courses within the first week of each term, a refund of 50% of tuition only is made. There is no refund of summer tuition after the first week.

## Evening Credit Division

### School of Arts and Sciences

Offering the Degree Bachelor of Arts in:
Arts and Sciences with Majors in:
  English
  History
  Chemistry
Offering the Degree Associate in Science in:
Arts and Sciences with Majors in:
  General Studies

### School of Business Administration

Offering the Degree Bachelor of Science in:
Business Administration with Majors in:
  Accounting
  Economics
  General Management
  Operations Management
    Including Computer Concentration
  Marketing
  Public and Social Administration
  Law Enforcement
Offering the Degree Associate in Science in:
  Business Administration

### School of Engineering

Offering the Degree Bachelor of Science in:
  Electrical Engineering
  Industrial Engineering
  Mechanical Engineering
Offering the Degree Associate in Science in:
  General Engineering
  Electrical Engineering
  Industrial Engineering
  Mechanical Engineering
  Metallurgical Engineering

### Extension Credit Division

Offering the Degree Associate in Science in:
  Police Science and Administration
Offering the Degree Bachelor of Science in:
  Public and Social Administration
    Law Enforcement Options in
      Administration or Science

  Mechanical Engineering
  Industrial Engineering
    (Groton, Connecticut)

# Arts & Sciences

## Bachelor of Arts

The Arts and Sciences program offers a college curriculum leading to a Bachelor of Arts degree upon completion. Students may earn a Bachelor of Arts degree in any of the following fields: Economics, English, History, or Chemistry.

Because some employers and some graduate schools in scientific and technical fields indicate a preference for the Bachelor of Science degree, this degree is offered in Chemistry. If the student wishes to obtain a Bachelor of Science in this major, he may do so by taking a heavier concentration in the sciences. The details of this program are to be obtained from the department chairmen.

**Matriculation for Bachelor Degree** Students who have completed at least two semesters or equivalent (30 academic credit hours) with a minimum quality point average of 2.00 may apply for matriculation for the Bachelor Degree.

Admission will be limited to applicants who have given evidence of capacity and motivation adequate for upper division work as determined by the department chairman.

## Requirements for the Degree

A cumulative quality point ratio of at least 2.00 is required in a Bachelor of Arts student's major field.

**Economics** An economics major within the broad program of liberal studies provides a preparation for higher positions in business and industry today. It is also excellent preparation for graduate work in business administration or for graduate study in economics itself.

Economics majors will be required to take, in addition to EC 133-134 (Principles of Economics I and II), a total of 30 semester hours, including EC 336 (Money and Banking), EC 320 (Mathematical Methods in Economics), EC 340 (Intermediate Economic Analysis), EC 445 (National Income Analysis and Business Cycles), EC 450 (Thesis). Beyond these requirements, a flexible program may be devised for each major to fit the student's needs and interests. With the approval of the chairman or some other member of the department, a student may elect suitable courses in other departments to fulfill the semester hour requirement. Where the Liberal Arts core curriculum calls for 12 semester hours of mathematics and/or science, economics majors are urged to take M 115 and M 116.

**English** The study of English as one of the humanistic disciplines offers a solid foundation for graduate work and a liberal education, developing abilities to think critically and write effectively.

The course requirement for English majors is E 113, 206, 211-212, 213-214, and 21 additional semester hours in course work beyond the sophomore level. While no specific courses are required, students will balance their work between period courses and other offerings of the English department. Their major programs must be approved by an advisor who is a member of the English department.

Prerequisites for courses numbered above 300 should include E 113, E 206 and E 211-212. Students not majoring in English who wish to take courses numbered above 300 should have permission of advisors.

**History** The study of history provides excellent preparation for those seeking professional careers in public service and general administration. This major also builds a good foundation for graduate study in various areas, such as law and teaching.

History majors, in addition to a full year of Western Civilization and American Civilization and with the approval of the chairman or some other member of the department, must take 24 additional semester hours. A flexible program may be devised for each major to fit his needs and interests. Suitable courses in other departments may be chosen to fulfill the semester hour requirement. Students may wish to elect most of their courses in history within a particular field of concentration, but a minimum of at least three courses must be chosen outside that field, at least one being either HS 317 (Renaissance and Reformation) or HS 321 (History of Ancient Greece and Rome). HS 416 (Thesis) is required of all majors.

**Chemistry** This major is offered for those students who wish to avail themselves of the many career opportunities in the general field of chemistry and also for those who wish to go on to graduate work with a broad liberal education and a thorough grounding in a scientific discipline.

A major in Chemistry must complete the following courses: twelve semester hours of German or Russian or the equivalent, PH 108, 209, 210; SC 411; CH 105, 106, 211, 301, 302, 341, 401, 431, 432, 451, 452 or an elective. In addition he is required to take Mathematics through M 203. Students whose primary interest is in biochemistry or in pre-medical or pre-dental programs should elect SC 121, 122, 131, 132.

## Core Requirements for Bachelor of Arts Program

The following course requirements must be fulfilled by all Bachelor of Arts Degree students.

*Bachelor of Arts*

| | |
|---|---|
| 18-30 s.h. | ENGLISH AND HUMANITIES |
| 3 | English Composition |
| 3 | English Composition and Literature |
| 6 | Fine Arts |
| 0-12 | *Foreign Language |
| 6 | Literature |
| 21 s.h. | SOCIAL STUDIES AND PHILOSOPHY |
| 6 | Economics |
| 6 | Western Civilization I & II |
| 3 | Philosophy |
| 6 | Psychology<br>Sociology<br>Political Science |
| 12 s.h. | **SCIENCE AND MATHEMATICS |
| | Physics |
| | Chemistry |
| | Science |
| | Biology |
| | Mathematics |
| n.c. | PHYSICAL EDUCATION—2 sem. |
| Total 60 s.h. | |

* Competence in the language equivalent to the second semester of the intermediate level.

** Students are urged to elect a laboratory science. If a student elects the first semester of a double number course in science, he must elect the second semester of that course.

## Bachelor of Arts Programs

FIRST YEAR

| | *Fall* | | | *Spring* | |
|---|---|---|---|---|---|
| E 113 | English Composition | 3 | E 206 | English Comp. & Lit. | 3 |
| HS 111 | Western Civilization | 3 | HS 112 | Western Civilization II | 3 |
| | Foreign Language | 3 | | Foreign Language | 3 |

SECOND YEAR

| | | | |
|---|---|---|---|
| Mathematics or Science | 3 | Mathematics or Science | 3 |
| *Electives | 6 | *Electives | 6 |

* Choices should be determined by the requirements of the student's major.

**Economics and History** PS 121, SS 113, P 111

**Chemistry** M 117, 118, CH 105, 106, German or Russian

TOTAL hours required for the Bachelor of Arts Degree—120-126 hours, depending on major selected.

### Bachelor of Science Program in Chemistry

Details of this program can be obtained before registration from the department chairman.

### Course Outlines

A layout of the following programs may be obtained from the Office of Continuing Education: English, Economics, History and Chemistry.

## Associate in Science Program

### GENERAL STUDIES

It is recognized that there are students who desire a general education. They include those who wish a college degree in the field of general studies but do not desire a bachelor degree. Also, there are those who have not selected their field of specialization but desire to start with education of a general nature. The general studies program provides an Associate degree which may be the basis for later transfer into a Bachelor degree program.

The total hours required are distributed as follows:

FIRST YEAR

| | *Fall* | *Sem. Hrs.* | | *Spring* | *Sem. Hrs.* |
|---|---|---|---|---|---|
| E 113 | *English Composition | 3 | E 206 | Eng. Comp. & Literature | 3 |
| E114 | Speech | 3 | P 111 | Psychology | 3 |
| HS 111 | Western Civ. I | 3 | HS 112 | Western Civ. II | 3 |
| | | | | | |
| | | SECOND YEAR | | | |
| E 201 | World Literature I | 3 | E 202 | World Literature II | 3 |
| SS 113 | Sociology | 3 | | Science *or* Math | 3 |
| | Science *or* Math | 3 | | Elective | 3 |
| | | | | | |
| | | THIRD YEAR | | | |
| E 211 | Survey of Eng. Lit. I *or* | | E 212 | Survey of Eng. Lit. II *or* | |
| E 213 | Survey of Am. Lit. I | 3 | E 214 | Survey of Am. Lit. II | 3 |
| EC 133 | Prin. of Economics I | 3 | EC 134 | Prin. of Economics II | 3 |
| | Elective *or* | | | Elective *or* | |
| | Foreign Language | 3 | | Foreign Language | 3 |
| | | | | | |
| | | FOURTH YEAR | | | |
| PHL 111 | Probs. of Philosophy *or* | | | | |
| PHL 113 | History of Philosophy | 3 | | | |
| | Elective | 3 | | | |

Electives totaling 12 semester hours are to be selected from any credit offerings of the College for which the student satisfies prerequisites.

TOTAL hours required for Associate in Science Degree—60 Semester Hours.

* Entrance into this course is permitted upon satisfactory performance on the placement examination.

# Business Administration

Bachelor of Science

The School of Business Administration offers preparation for managerial and administrative responsibilities through a program leading to the degree of Bachelor of Science in Business Administration. Students are familiarized with the basic concepts of business administration and given training in the use of the fundamental tools of management common to the private and the public sectors of the economy. The course of study combines a strong professional program in business areas with a comprehensive background in liberal arts.

The liberal arts program is essential to the student's development as an educated man conversant with the principal currents of thought and events of the world and especially of the western world and of his American heritage. In addition to furthering the development of a social conscience this program enables the student to view business against the broader background of society's affairs.

## Requirements for the Degree

Of the total 126 semester hours required for graduation, 66 semester hours are taken in the liberal arts. The liberal arts courses required of business students are English Composition, 3 s.h.; English Composition and Literature, 3 s.h.; an additional 6 s.h. of Literature; Western Civilization I and II, 6 s.h.; Principles of Economics I and II, 6 s.h.; Introduction to Problems of Philosophy, 3 s.h.; Psychology, 3 s.h.; American Government, 3 s.h.; Sociology, 3 s.h.; Mathematical Analysis I and II, 6 s.h.; and a science course, 6 s.h.

The student will select 18 hours of elective courses in the liberal arts. A student contemplating attendance at a graduate school would be well advised to attain a foreign language competency equal to a second year college course.

The business course comprises 60 semester hours of work. Of this total, 30 semester hours, one half of the business program, constitute the business core courses which are taken by all students. The core subjects are Accounting I, Accounting II, Legal Concepts, Management and Organization, Statistics, Finance, Marketing, Data Processing, Managerial Economics, and Seminar.

The School of Business Administration considers it axiomatic that a graduate is better prepared when his collegiate business background has been comprehensive than when his work has been highly specialized. Consequently only a limited amount of specialization is permitted in the departmental majors of general management, operations management, marketing, public and social administration and economics. Somewhat more specialization is permitted in accounting because of circumstances specific to this field. Each of the majors, with the exception of accounting, has a 12 s.h. requirement. An additional 3 s.h. in the major is permitted in selecting 18 s.h. of business electives.

The business student with special interest in computers and data processing will ordinarily major in Operations Management. However, such training can also be combined with the other major, e.g., General Management or Marketing, by the judicious selection of electives.

The department requirements for majors are the following:

**General Management** Industrial Relations, Risk and Insurance, Advanced Statistics, Financial Management.

**Operations Management** Cost Control, Production Control, Operations Research, Systems Analysis.

**Marketing** Advertising and Promotion, Marketing Management, Marketing Research, International Business.

**Economics** Money and Banking, Government Regulation of Business, Economics of Labor Relations, Intermediate Economic Analysis.

**Accounting** Intermediate Accounting I and II, Advanced Accounting I and II, Cost Accounting I and II, Auditing I, Income Tax Procedure I.

**Public and Social Administration** Public Administration, Public Finance, and either Municipal Government, and Systems Analysis or Social Administration I and II.

Business electives will be chosen in consultation with the student's advisor. Eighteen semester hours will be selected, of which three semester hours may be in the student's major field. The accounting major will have 6 semester hours of unrestricted business electives. The term *business electives* means all courses listed in the School of Business Administration other than the business core courses and the required courses in the student's major. All courses offered by the Department of Economics are included.

Because of the increasing use of mathematics in the quantitative treatment of business matters and because of the emphasis on mathematics in the graduate schools, some advanced work in mathematics may be selected by the student as part of his business electives.

The courses offered by the respective business departments in addition to business core and major required courses are the following:

**General Management** Business Law II, Physical Distribution Management.

**Operations Management** Business Games, Programming.

**Marketing** Retailing, Sales Management, Industrial Marketing.

**Economics** See under Economics elsewhere in this catalog.

**Accounting** Auditing II, Income Tax Procedure II.

**Public and Social Administration** Internship I and II, Minority Groups, Urban Sociology.

## PROGRAM

All business students follow similar programs except for course selection in their major fields as indicated below.

| **Semester** | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Liberal Arts | Composition<br>Math | Literature<br>Math | Economics<br>Sociology | Economics<br>Psychology |
| Business | Legal Concepts | Marketing | Computers | Mgmt. & Org. |
| **Semester** | 5 | 6 | 7 | 8 |
| Liberal Arts | Science<br>Pol. Sc. | Science<br>Philosophy | Literature<br>History | Literature<br>History |
| Business | Acctg. Prin. | Acctg. Prin. | Statistics | Finance |
| **Semester** | 9 | 10 | 11 | 12 |
| Liberal Arts | L.A. Elect. | L.A. Elect. | L.A. Elect. | L.A. Elect. |
| Business | Major<br>Bus. Elect. | Major<br>Bus. Elect. | Major<br>Bus. Elect. | Major<br>Bus. Elect. |
| **Semester** | 13 | 14 | | |
| Liberal Arts | L.A. Elect. | L.A. Elect. | | |
| Business | Mgr. Econ.<br>Bus. Elect. | Seminar<br>Bus. Elect. | | |

TOTAL—Bachelor of Science Degree in Business Administration: 126 semester hours.

## Admission Requirements

An applicant for admission to the Business Administration Programs should be a graduate of an approved secondary school. While no set program of high school subjects is prescribed, an applicant must meet the standards of the College in respect to the high school average and present 15 acceptable units of satisfactory work, including 9 or more units (4 in English) of college preparatory subjects. All students will receive placement examinations. Non-college-credit courses are available to remedy deficiencies.

**Matriculation for Bachelor Degree** Students who have completed at least two semesters or equivalent (30 academic credit hours) with a minimum quality point average of 2.00 may apply for matriculation for the Bachelor Degree.

Admission will be limited to applicants who have given evidence of capacity and motivation adequate for upper division work as determined by the Department Chairman.

A minimum cumulative quality point average of 2.00 must be attained for graduation in School of Business Administration required courses and departmental major required courses.

## Associate in Science Program

This program lays the groundwork in business principles and practices and supplies the necessary liberal arts courses. Included in the business courses are basic courses in economics, accounting, marketing, and the effects of government and law on business. A minimum of 60 semester hours is required for the Associate in Science Degree in Business Administration.

Note—Course layouts for both the Associate and Bachelor degree programs are obtained at the Office of Continuing Education.

# Engineering

## Associate in Science Programs

The purpose of this series of Engineering Programs is to meet the needs of students who wish to specialize in one of the fields of engineering offered by the College without undertaking a bachelor program. The first two years a student will take the necessary courses in Physics and Mathematics which are prerequisites for most engineering courses. The third and fourth years allow selection from the following engineering fields: General, Electrical, Industrial, Mechanical, or Metallurgical. A minimum of 60 semester hours is required for the Associate in Science Degree in Engineering.

### COMMON CORE COURSES

First Year

| | *Fall* | *Sem. Hrs.* | | *Spring* | *Sem. Hrs.* |
|---|---|---|---|---|---|
| E 113 | *English Composition | 3 | M 117 | Calculus I | 3 |
| ME 101 | Graphics I | 3 | IE 114 | Management Survey | 3 |
| M 115 | *Intro. Analysis I | 3 | IE 102 | Intro. to Computers | 3 |

Second Year

| | | | | | |
|---|---|---|---|---|---|
| MT 123 | Engineering Materials | 3 | M 118 | Calculus II | 3 |
| PH 201 | Physics I w/lab | 3 | PH 202 | Physics II w/lab | 3 |

* Entrance into these courses is permitted upon satisfactory performance on the placement examinations.

## Major in General Engineering

Third and Fourth Years

| | *Fall* | *Sem. Hrs.* | | *Spring* | *Sem. Hrs.* |
|---|---|---|---|---|---|
| CH 103 | General Chem. w/lab | 3 | ME 124 | Mechanical Processes | 3 |
| ME 102 | Engr. Drawing & Design | 3 | E 201 | Humanities I | 3 |
| | Electives | 9 | | Electives | 9 |

Electives totaling 18 semester hours must be approved by the Dean of the Engineering School.

## Major in Electrical Engineering

Third and Fourth Years

| | *Fall* | *Sem. Hrs.* | | *Spring* | *Sem. Hrs.* |
|---|---|---|---|---|---|
| EE 223 | Prin. of Elect. Engin. I | 3 | EE 224 | Prin. of Elect. Engin. II | 3 |
| EE 331 | Alt. Current Circuits I | 3 | EE 332 | Alt. Current Circuits II | 3 |
| M 203 | Calculus III | 3 | M 204 | Differential Equations | 3 |
| | | | | Restricted Electives | 12 |

Restrictive electives totaling 12 semester hours are to be selected from the following courses:

| | | | | | |
|---|---|---|---|---|---|
| CH 105-106 | Gen. Chem. w/lab | 8 | M 303 | Advanced Calculus I | 3 |
| EE 330 | Intro. to Automation | 3 | M 304 | Advanced Calculus II | 3 |
| EE 336 | Instrum. Electronics | 3 | EE 437 | Ind. Power Systems Engr. | 3 |
| EE 343-344 | Electrical Machines | 8 | EE 438 | Elec. Power Tranmission | 3 |
| EE 345 | Auto. Control Theory and Practice | 3 | ME 201 | Mechanics-Statics | 3 |
| | | | ME 204 | Mechanics-Dynamics | 3 |

## Major in Industrial Engineering

### Third and Fourth Years

| | *Fall* | *Sem. Hrs.* | | *Spring* | *Sem. Hrs.* |
|---|---|---|---|---|---|
| EC 133 | Prin. of Economics I | 3 | IE 204 | Engineering Economics | 3 |
| IE 241 | Methods & Motion Study | 3 | IE 342 | Work Measurement | 3 |
| | Restricted Electives | 12 | ME 124 | Mechanical Processes | 3 |
| | | | | Free Elective | 3 |

Restricted electives totaling 12 semester hours are to be selected from the following courses:

| | | | | | |
|---|---|---|---|---|---|
| A 113 | Industrial Accounting | 3 | IE 233 | Cost Control | 3 |
| EC 240 | Econ. of Labor Relations | 3 | IE 234 | Production Control | 3 |
| E 220 | Tech. Report Writing | 3 | IE 346 | Statistical Analysis | 3 |
| IE 119 | Indust. Safety & Hygiene | 3 | IE 351 | Synthetic Motion-Time Systems | 3 |
| IE 221 | Data Processing | 3 | | | |
| IE 224 | Programming | 3 | IE 223 | Personnel Administration | 3 |

## Major in Mechanical Engineering

### Third and Fourth Years

| | *Fall* | *Sem. Hrs.* | | *Spring* | *Sem. Hrs.* |
|---|---|---|---|---|---|
| ME 201 | Mechanics-Statics | 3 | ME 204 | Mechanics-Dynamics | 3 |
| ME 124 | Mechanical Processes | 3 | ME 202 | Mechanics of Materials I | 3 |
| M 203 | Calculus III | 3 | M 204 | Diff. Equations | 3 |
| | Restricted Electives | 9 | | Free Elective | 3 |

Restricted electives totaling 9 semester hours are to be selected from the following courses:

| | | | | | |
|---|---|---|---|---|---|
| EE 223 | Prin. of Elec. Engr. I | 3 | EE 224 | Prin. of Elec. Engr. II | 3 |
| CH 103 | General Chem. w/lab | 3 | CH 105 | General Chem. I w/lab | 4 |
| ME 337 | Heat Power | 3 | ME 321 | Fluid Dynamics | 3 |
| ME 311 | Machine Elements | 3 | ME 315-316 | M.E. Laboratory I & II | 2 |
| ME 343 | Mechanisms | 3 | ME 312 | Mechanical Design | 3 |
| ME 307 | Mech. of Materials II | 3 | MT 219 | Physical Metallurgy | 3 |
| | | | MT 220 | Metallography | 3 |

## Major in Metallurgical Engineering

### Third and Fourth Years

| | *Fall* | *Sem. Hrs.* | | *Spring* | *Sem. Hrs.* |
|---|---|---|---|---|---|
| CH 105 | Gen. Chemistry I w/lab | 4 | CH 106 | Gen. Chemistry II w/lab | 4 |
| MT 219 | Physical Metallurgy | 3 | ME 124 | Mechanical Processes | 3 |
| | Free Elective | 3 | MT 220 | Metallography | 3 |
| | Restricted Electives | 6 | | Restricted Electives | 6 |

Restricted electives totaling 12 semester hours are to be selected from the following courses:

| | | | | | |
|---|---|---|---|---|---|
| M 203 | Calculus III | 3 | PH 210 | Physics III | 3 |
| ME 201 | Mechanics Statics | 3 | PH 315 | Nuclear Physics | 3 |
| ME 204 | Mechanics-Dynamics | 3 | PH 323 | Physics IV | 3 |
| ME 202 | Mechanics of Materials | 3 | MT 301 | Welding Metallurgy | 3 |
| MT 324 | Nuclear Metallurgy | 3 | MT 302 | Rubber & Plastics Technology | 3 |
| MT 331 | Non-ferrous Metallurgy | 3 | | | |
| MT 342 | Steels & Their Heat Treatment | 3 | MT 304 | High Temperature Alloys | 3 |

## Bachelor of Science Programs

The engineering programs combine the basic courses in chemistry, mathematics, physics, humanities, and social sciences with advanced studies in the various branches of engineering. All students are required to take the same core courses which comprise the first four years of the engineering program. An associate degree in engineering may be received upon completion of the core program.

### COMMON CORE COURSES

FIRST YEAR

| | *Fall* | *Sem. Hrs.* | | *Spring* | *Sem. Hrs.* |
|---|---|---|---|---|---|
| E 113 | *English Composition | 3 | HS 112 | Western Civ. II | 3 |
| HS 111 | Western Civ. I | 3 | M 118 | Calculus II | 3 |
| M 117 | *Calculus I | 3 | IE 102 | Intro. to Computers | 3 |

SECOND YEAR

| | | | | | |
|---|---|---|---|---|---|
| PH 108 | Physics I | 3 | PH 209 | Physics II | 3 |
| EC 133 | Prin. of Economics I | 3 | M 204 | Diff. Equations | 3 |
| M 203 | Calculus II | 3 | E 201 | Humanities I | 3 |

THIRD YEAR

| | | | | | |
|---|---|---|---|---|---|
| E 202 | Humanities II | 3 | EE 224 | Prin. of Elec. Engr. II | 3 |
| EE 223 | Prin. of Elec. Engr. I | 3 | ME 204 | Mechanics-Dynamics | 3 |
| ME 201 | Mechancs-Statics | 3 | | | |

FOURTH YEAR

| | | | | | |
|---|---|---|---|---|---|
| PH 209 | Physics II | 3 | ME 202 | Mech. of Materials I | 3 |
| CH 105 | Gen. Chem. I w/lab | 4 | IE 204 | Engr. Economics | 3 |
| | | | PH 210 | Physics III | 3 |

* Entrance into this course is permitted upon satisfactory performance on placement examinations.

TOTAL—Associate in Science Degree in Engineering: 64 semester hours.

## ELECTRICAL ENGINEERING

Upon satisfactory completion of the four-year core program, the student may pursue advanced courses with specialization in electronics, computers, servomechanisms or industrial controls leading to the Bachelor of Science degree in Electrical Engineering.

In order to acquire the Bachelor of Science degree, the student must complete the required courses listed below and a selected group of electives in the field of his choice.

### FIFTH AND SIXTH YEARS

| | *Fall* | *Sem. Hrs.* | *Lab. Hrs.* | *Class Hrs.* |
|---|---|---|---|---|
| EE 331 | Alt. Cur. Circ. I | 3 | 0 | 3 |
| EE 347 | Electron. Devices and Circuits I | 3 | 0 | 3 |
| EE 349 | Electronic Laboratory I | 1 | 3 | 0 |
| EE 351 | System Analysis | 3 | 0 | 3 |
| EE 343 | Electrical Machines I | 3 | 0 | 3 |
| EE 353 | Electrical Machines Laboratory I | 1 | 3 | 0 |
| M 303 | Advanced Calculus I | 3 | 0 | 3 |
| | | 17 | 6 | 15 |

| | *Spring* | *Sem. Hrs.* | *Lab. Hrs.* | *Class Hrs.* |
|---|---|---|---|---|
| EE 332 | Alt. Cur. Circ. II | 3 | 0 | 3 |
| EE 348 | Electron. Devices and Circuits II | 3 | 0 | 3 |
| EE 350 | Electronic Laboratory II | 1 | 3 | 0 |
| EE 352 | Advance Network Theory | 3 | 0 | 3 |
| EE 344 | Electrical Machines II | 3 | 0 | 3 |
| EE 354 | Electrical Machines Lab. II | 1 | 3 | 0 |
| | Social Studies or Philosophy Elective | 3 | 0 | 3 |
| | | 17 | 6 | 15 |

### SEVENTH AND EIGHTH YEARS

| | *Fall* | *Sem. Hrs.* | *Lab. Hrs.* | *Class Hrs.* |
|---|---|---|---|---|
| EE 455 | Servomechanisms I *or* | | | |
| EE 441 | Electronic Analog Computers | 3 | 0 | 3 |
| EE 450 | Semiconductor Electronics I | 3 | 0 | 3 |
| EE 437 | Industrial Power Systems Engr. | 3 | 0 | 3 |
| EE 461 | Waves and Fields | 3 | 0 | 3 |
| ME 337 | Heat Power | 3 | 0 | 3 |
| | Restricted Engr. Elective | 3 | 0 | 3 |
| | | 18 | 0 | 18 |

| | *Spring* | *Sem. Hrs.* | *Lab. Hrs.* | *Class Hrs.* |
|---|---|---|---|---|
| EE 456 | Servomechanisms II *or* | | | |
| EE 442 | Electronic Digital Computers | 3 | 0 | 3 |
| EE 500 | Seminar in Transistor Electronics *or* | | | |
| EE 462 | Microwave Fundamentals | 3 | 0 | 3 |
| EE 451 | Semiconductor Electronics II | 3 | 0 | 3 |
| PH 323 | Physics IV | 3 | 0 | 3 |
| EE 504 | Lab. Thesis *or* | 3 | 3 | 0 |
| | Restricted Engr. Elective | 3 | 0 | 3 |
| | Social Studies or Philosophy Elective | 3 | 0 | 3 |
| | | 18 | 0-3 | 15-18 |

## Selection of Electives

Restricted electives totaling 6 semester hours, or 3 plus Laboratory Thesis, are to be chosen in consultation with department members and must be approved by the chairman of the Department of Electrical Engineering.

TOTAL—Bachelor of Science Degree in Electrical Engineering: 134 semester hours.

## INDUSTRIAL ENGINEERING

The program in Industrial Engineering is planned to prepare students to apply engineering methods in the solving of the problems of management in industry.

After successful completion of the four-year core program, the student will complete the following required courses and electives as listed.

### FIFTH AND SIXTH YEARS

| | *Fall* | *Sem. Hrs.* | *Lab. Hrs.* | *Class Hrs.* |
|---|---|---|---|---|
| IE 346 | Statistical Analysis | 3 | 0 | 3 |
| PH 323 | Physics IV | 3 | 0 | 3 |
| A 113 | Indus. Accounting | 3 | 0 | 3 |
| IE 241 | Methods and Motion Study | 3 | 2 | 2 |
| IE 214 | Management Theory | 3 | 0 | 3 |
| | Restricted Elective | 3 | 0 | 3 |
| | | 18 | 2 | 17 |

| | *Spring* | *Sem. Hrs.* | *Lab. Hrs.* | *Class Hrs.* |
|---|---|---|---|---|
| IE 436 | Quality Control | 3 | 0 | 3 |
| IE 502 | Operations Research | 3 | 0 | 3 |
| IE 234 | Production Control | 3 | 0 | 3 |
| IE 342 | Work Measurement | 3 | 2 | 2 |
| ME 124 | Mechanical Processes | 3 | 2 | 3 |
| | Restricted Elective | 3 | 0 | 3 |
| | | 18 | 4 | 17 |

### SEVENTH AND EIGHTH YEARS

| | *Fall* | *Sem. Hrs.* | *Lab. Hrs.* | *Class Hrs.* |
|---|---|---|---|---|
| IE 233 | Cost Control | 3 | 0 | 3 |
| IE 443 | Factory Planning | 3 | 2 | 2 |
| EC 350 | Econ. of Labor Relations | 3 | 0 | 3 |
| | *Math Elective | 3 | 0 | 3 |
| | Restricted Elective | 3 | 0 | 3 |
| | Social Studies or Philosophy Elective | 3 | 0 | 3 |
| | | 18 | 2 | 17 |

| | *Spring* | *Sem. Hrs.* | *Lab. Hrs.* | *Class Hrs.* |
|---|---|---|---|---|
| EE 336 | Instrum. Electron. | 3 | 0 | 3 |
| IE 507 | Systems Analysis | 3 | 0 | 3 |
| IE 504 | Lab. Thesis | 3 | 3 | 0 |
| | Elective | 3 | 0 | 3 |
| | Social Studies or Philosophy Elective | 3 | 0 | 3 |
| | | 15 | 3 | 12 |

### Selection of Electives

* M 372 Mathematical Statistics or M 237 Scientific Programming.

Restricted electives totaling 6 semester hours are to be chosen in consultation with department members and must be approved by the chairman of the Department of Industrial Engineering. Students may secure restricted elective guide sheets from the Reception Office or from the department chairman.

TOTAL—Bachelor of Science Degree in Industrial Engineering: 133 semester hours.

## MECHANICAL ENGINEERING

(Bachelor of Science)

Upon satisfactory completion of the four-year core program, the student may pursue advanced courses with specialization in machine design, automatic control, metallurgy, mechanics, etc., leading to the Bachelor of Science degree. The student must complete the required courses listed below and a selected group of electives in the field of his choice.

### Fifth and Sixth Years

| | *Fall* | *Sem. Hrs.* | *Lab. Hrs.* | *Class Hrs.* |
|---|---|---|---|---|
| ME 301 | Thermodynamics I | 3 | 0 | 3 |
| ME 315 | M.E. Lab. I | 2 | 3 | 0 |
| ME 124 | Mechanical Proc. | 3 | 2 | 2 |
| ME 307 | Mech. of Materials II | 3 | 0 | 3 |
| M 231 | Linear Algebra *or* | | | |
| M 303 | Adv. Calculus I | 3 | 0 | 3 |
| | Social Studies or Philosophy Elective | 3 | 0 | 3 |
| | | 17 | 5 | 14 |

| | *Spring* | *Sem. Hrs.* | *Lab. Hrs.* | *Class Hrs.* |
|---|---|---|---|---|
| ME 302 | Thermodynamics II | 3 | 0 | 3 |
| ME 344 | Mech. of Vibration | 3 | 0 | 3 |
| ME 321 | Fluid Mechanics | 3 | 0 | 3 |
| ME 311 | Machine Elements | 3 | 0 | 3 |
| M 301 | Linear Algebra *or* | | | |
| M 304 | Adv. Calculus II | 3 | 0 | 3 |
| | Social Studies or Humanities Elective | 3 | 0 | 3 |
| | | 18 | 0 | 18 |

### Seventh and Eighth Years

| | *Fall* | *Sem. Hrs.* | *Lab. Hrs.* | *Class Hrs.* |
|---|---|---|---|---|
| ME 312 | Mechanical Design | 3 | 0 | 3 |
| ME 322 | Gas Dynamics | 3 | 0 | 3 |
| ME 401 | Systems Analysis | 3 | 0 | 3 |
| ME 415 | M.E. Lab. #2 | 2 | 3 | 0 |
| ME 404 | Heat Transfer | 3 | 0 | 3 |
| | Restricted Elective | 3 | 0 | 3 |
| | | 17 | 3 | 15 |

| | *Spring* | *Sem. Hrs.* | *Lab. Hrs.* | *Class Hrs.* |
|---|---|---|---|---|
| MT 219 | Phys. Metallurgy | 3 | 2 | 2 |
| EE 336 | Instrum. Electron. | 3 | 0 | 3 |
| PH 323 | Physics IV | 3 | 0 | 3 |
| ME 512 | Senior Seminar | 3 | 0 | 1 |
| | Restricted Elective | 3 | 0 | 3 |
| | Elective | 3 | 0 | 3 |
| | | 18 | 2 | 15 |

### Selection of Electives

Restricted Electives are to be chosen from available courses in Engineering, Mathematics, or Science. Students interested in the field of Materials and Metallurgy may obtain permission from the Chairman of the Department of Mechanical Engineering or Civil Engineering to substitute available courses in these areas for certain required Junior and Senior year Mechanical Engineering courses listed above.

TOTAL—Bachelor of Science Degree in Mechanical Engineering: 134 semester hours.

# Extension Credit Division Programs

## BACHELOR DEGREE PROGRAMS IN ENGINEERING

(Groton, Connecticut)

These are Junior and Senior year evening programs given at Groton, Connecticut, leading to the Bachelor of Science degrees in Mechanical and Industrial Engineering. It is open to all qualified students possessing the equivalent of a two year Associate in Science degree in Engineering. The Admissions policy for these courses is the same as stated for the Engineering program at the West Haven Campus. The course outlines for these programs are also the same.

Tuition: $95.00 per 3 semester hour course, which includes registration fees.

Textbooks are available at the College Book store and at the opening of the class.

## LAW ENFORCEMENT

### Associate in Science Program

The Associate Degree Program in Police Science and Administration has the two-fold objective of preparing students to be proficient in the many aspects of police work and, at the same time, of providing a basic core of general college studies.

Students will complete 33 credits in general studies courses and 27 credits in specialized police courses.

| | First Semester | *Sem. Hrs.* | | Second Semester | *Sem. Hrs.* |
|---|---|---|---|---|---|
| E 113 | *English Composition | 3 | E 206 | Eng. Comp. & Literature | 3 |
| E 114 | Speech | 3 | P 111 | Psychology | 3 |
| PA 103 | Police Organ. & Admin. I | 3 | PA 104 | Police Organ. & Admin. II | 3 |
| | Third Semester | | | Fourth Semester | |
| PA 106 | Police Supervision | 3 | P 32 | Social Psych. (Police) | 3 |
| SS 113 | Sociology | 3 | PA 217 | American Legal System I | 3 |
| PS 121 | American Government | 3 | PS 122 | State & Local Govt. | 3 |
| | Fifth Semester | | | Sixth Semester | |
| E 201 | World Lit. I | 3 | E 202 | World Lit. II | 3 |
| | Language Elective | 3 | | Language Elective | 3 |
| PA 215 | Principles of Investigation | 3 | PA 201 | Intro. to Forensic Science | 3 |
| | Seventh Semester | | | | |
| PA 218 | American Legal System II | 3 | | | |
| PA 221 | Juvenile Delinquency | 3 | | | |

TOTAL—Required for the Associate in Science Degree: 60 semester hours.

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* Entrance into this course is permitted upon satisfactory performance on the placement examination.

## Bachelor of Science Programs

A four year bachelor degree program in law enforcement is offered as an option under the public and Social Administration Major. It is planned for high school graduates interested in any of the many careers in the administration and operation of criminal justice. These may be in state, local, or federal services or in private investigation or security forces.

Two options are provided in this program. The first is in Law Enforcement—Administration. The supervision of law enforcement is largely concerned with the activities and behavior of people in terms of maintaining law and order, providing needed services, and protecting life and property. The program provides the basic studies in the liberal arts and business administration with the required courses in the administration of law enforcement to prepare the individual for a management career in this field. The second is in Law Enforcement—Science. It includes a strong emphasis on chemistry, mathematics, and physics as well as the laboratory techniques directly related to criminal investigation. The basic liberal arts studies are again included.

### LAW ENFORCEMENT—ADMINISTRATION

| | First Semester | *Sem. Hrs.* | | Second Semester | *Sem. Hrs.* |
|---|---|---|---|---|---|
| E 113 | *English Composition | 3 | E 206 | Eng. Comp. & Literature | 3 |
| E 114 | Speech | 3 | P 111 | Psychology | 3 |
| PA 103 | Police Organ. & Admin. I | 3 | PA 104 | Police Organ. & Admin. II | 3 |
| | Third Semester | | | Fourth Semester | |
| PA 106 | Police Supervision | 3 | P 321 | Social Psych. (Police) | 3 |
| SS 113 | Sociology | 3 | PA 217 | American Legal System I | 3 |
| PS 121 | American Government | 3 | PS 122 | State & Local Govt. | 3 |
| | Fifth Semester | | | Sixth Semester | |
| E 201 | Humanities I | 3 | E 202 | Humanities II | 3 |
| | Language Elective | 3 | | Language Elective | 3 |
| PA 215 | Principles of Investigation | 3 | PA 201 | Intro. to Forensic Science | 3 |
| | Seventh Semester | | | Eighth Semester | |
| PA 218 | American Legal System II | 3 | M 116 | Mathematical Analysis II | 3 |
| PA 221 | Juvenile Delinquency | 3 | PS 302 | U. S. Constitution | 3 |
| M 115 | Mathematical Analysis I | 3 | SS 214 | Problems in Sociology | 3 |
| | Ninth Semester | | | Tenth Semester | |
| SC 111 | Physical Science I | 3 | SC 112 | Physical Science II | 3 |
| M 227 | Finite Mathematics I | 3 | M 228 | Finite Mathematics II | 3 |
| EC 133 | Principles of Economics I | 3 | EC 134 | Principles of Economics II | 3 |
| | Eleventh Semester | | | Twelfth Semester | |
| IE 221 | Data Processing | 3 | IE 224 | Programming | 3 |
| | Elective | 3 | | Elective | 3 |
| SC 121 | Biology I | 3 | SC 122 | Biology II | 3 |
| SC 131 | Biology Lab. I | 1 | SC 132 | Biology Lab. II | 1 |
| | Thirteenth Semester | | | Fourteenth Semester | |
| IE 507 | Systems Analysis | 3 | PL 111 | Philosophy | 3 |
| SS 216 | Municipal Government | 3 | PA 311 | Criminology | 3 |
| | Elective | 3 | PA 401 | Police Problems Seminar | 3 |

TOTAL—Required for the Bachelor of Science Degree: 128 semester hours.

* Entrance into this course is permitted upon satisfactory performance on the placement examination.

## LAW ENFORCEMENT—SCIENCE

| | FIRST SEMESTER | *Sem. Hrs.* | | SECOND SEMESTER | *Sem. Hrs.* |
|---|---|---|---|---|---|
| E 113 | *English Composition | 3 | E 206 | Eng. Comp. & Literature | 3 |
| E 114 | Speech | 3 | P 111 | Psychology | 3 |
| PA 103 | Police Organ. & Admin. I | 3 | PA 104 | Police Organ. & Admin. II | 3 |
| | THIRD SEMESTER | | | FOURTH SEMESTER | |
| PA 106 | Police Supervision | 3 | P 321 | Social Psych. (Police) | 3 |
| SS 113 | Sociology | 3 | PA 217 | American Legal System I | 3 |
| PS 121 | American Government | 3 | PS 122 | State & Local Govt. | 3 |
| | FIFTH SEMESTER | | | SIXTH SEMESTER | |
| E 201 | World Literature I | 3 | E 202 | World Literature II | 3 |
| | Language Elective | 3 | | Language Elective | 3 |
| PA 215 | Principles of Investigation | 3 | PS 216 | Municipal Government | 3 |
| | SEVENTH SEMESTER | | | EIGHTH SEMESTER | |
| PA 218 | American Legal System II | 3 | M 116 | Mathematical Analysis II | 3 |
| PA 221 | Juvenile Delinquency | 3 | PS 302 | U. S. Constitution | 3 |
| M 115 | Mathematical Analysis I | 3 | | Philosophy | 3 |
| | NINTH SEMESTER | | | TENTH SEMESTER | |
| CH 105 | Chemistry I w/lab. | 4 | CH 106 | Chemistry II w/lab. | 4 |
| SC 121 | Biology I | 3 | SC 131 | Biology II | 3 |
| SC 131 | Biology Lab. I | 1 | SC 132 | Biology Lab. II | 1 |
| M 227 | Finite Mathematics I | 3 | M 228 | Finite Mathematics II | 3 |
| | ELEVENTH SEMESTER | | | TWELFTH SEMESTER | |
| IE 221 | Data Processing | 3 | IE 224 | Programming | 3 |
| PH 201 | Gen. Physics I w/lab. | 3 | PH 202 | Gen. Physics II w/lab. | 3 |
| EC 133 | Principles of Economics I | 3 | EC 134 | Principles of Economics II | 3 |
| | THIRTEENTH SEMESTER | | | FOURTENTH SEMESTER | |
| IE 507 | Systems Analysis | 3 | PA 401 | Police Problems Seminar | 3 |
| PA 303 | Forensic Lab. I | 3 | PA 311 | Criminology | 3 |
| | Elective | 3 | PA 304 | Forensic Lab. II | 3 |

TOTAL—Required for the Bachelor of Science Degree: 130 semester hours.

* Entrance into this course is permitted upon satisfactory performance on the placement examination.

# Description of Courses

## Accounting

**A 111-112. Introductory Accounting. Credit, 6 semester hours.**

Prerequisite to all other courses in accounting.

Offered also in Spring Semester on a two nights per week basis.

Familiarizes the student with fundamental principles of accounting. Supplemented by progress tests, problems, and systematic practice work. Interpretation of assets, liabilities, and net worth; preparation of statements; books of original entry; ledgers; and work at the end of a fiscal period.

**A 113. Industrial Accounting. Credit, 3 semester hours.**

Not open to School of Business Administration students.

Acquaints engineering students with the vocabulary of accounting, the accounting cycle, and the presentation of accounting statements.

**A 221-222. Intermediate Accounting. Credit, 6 semester hours.**

Prerequisite: A 112.

Continuation at a more advanced level of the principles studied in Introductory Accounting. Adapted to present-day changes in the accounting profession. The corporation, asset valuations, liabilities, installment sales and consignments, analysis and interpretation of financial statements, sources and application of funds, depreciation methods, inventory evaluation, reserves, and surplus analysis. Considerable practice in the form of problem solutions. Reference made to the publications of the professional accounting societies.

**A 223-224. Cost Accounting. Credit, 6 semester hours.**

Prerequisite: A 112.

Cost concepts, classifications, and systems from the point of view of cost determination (accumulation of material, labor, and overhead by jobs, processes, etc.), cost control (budgets, standards, etc. compared to actuals), and cost analysis and reporting for intelligent management decisions. Differential and comparative cost analysis, break-even analysis, capital expenditure planning, and internal profit measurements and pricing policies.

**A 331-332. Advanced Accounting. Credit, 6 semester hours.**

Prerequisite: A 222.

Final general accounting course covering all phases of accounting not previously covered and not considered of a specialized nature. Given in two sections, neither section being dependent upon the other. Upon completion of these sections, the student is prepared for advanced study in specialized accounting problems.

**A 333. Auditing I. Credit, 3 semester hours.**

Prerequisite: A 222.

Evaluation of the effectiveness of the various accounting systems and procedures as they relate to internal control. Auditing procedures to test reliability are developed, followed by teachings of prerequisites that are to be met for auditing standards applicable to "field work." A practice case links the course to practice.

**A 334. Auditing II. Credit, 3 semester hours.**

Prerequisite: A 333.

Introduction to the profession of auditors (internal and independent). The intricacies and the variety of audit report presentations. Full coverage of auditing standards and the latest developments in the field of auditing. Principles of internal control questionnaire and audit program designs.

**A 335. Income Tax Procedures I. Credit, 3 semester hours.**

Prerequisite: A 112.

The law and the procedures for individual income tax returns. Includes the determination of gross income, ordinary gains and losses, capital gains and losses, dividends, deductions of all kinds, and withholding.

**A 336. Income Tax Procedures II. Credit, 3 semester hours.**

Prerequisite: A 335.

Continuation of the law and procedures to cover installment sales, inventories, accounting etc., and handling taxes of partnerships, estates and trusts, and corporations, including reorganizations, personal holding companies, etc. Processes of filing returns, paying taxes, and getting refunds. Coverage of Social Security, Federal Estate and Gift taxes.

## Art

**ART 101-102. Drawing and Painting I and II. Credit, 6 semester hours.**

Fundamentals of drawing and painting. Problems in drawing alternate throughout the year with painting projects. Exercises to develop coordination of hand and eye; drawing objects in correct perspective; study of the human figure, its volumes, shifting axes, and action. Exploitation of line as a means of articulating the structure of forms and space.

**ART 111-112. Design I and II. Credit, 6 semester hours.**

Visual elements of art: texture, line, color, shape, and space and the factors which affect their organization in visual design. Elementary non-representational design. The study of color.

**ART 122. Layout and Printing Techniques. Credit, 3 semester hours.**

Techniques of layout, lettering, and design in relation to printing methods.

**ART 131. History of Art to the Renaissance. Credit, 3 semester hours.**

World art as an expressive and social phenomenon from its earliest beginnings, through religious and cultural cycles, to the visual developments of the Renaissance.

**ART 132. History of Modern Art. Credit, 3 semester hours.**

Art of the twentieth century in Europe and America, its roots in the past, its function as an expression of our contemporary civilization.

**ART 201-202. Drawing and Painting III and IV. Credit, 6 semester hours.**

Prerequisite: Art 102.

Continuation of Drawing and Painting I and II. Perfection of techniques.

**ART 203 Commercial Art I. Credit, 3 semester hours.**

Problems of graphic arts and advertising. Relations between the arts and methods of communication. An introduction to the fields of advertising, illustration, and editorial art; the role of the advertising agency; and the analysis of ideas for visual statement.

**ART 204. Commercial Art II. Credit, 3 semester hours.**

Prerequisite: Art 203.

The organization and presentation of a project which demonstrates the student's ability to apply theory on a professional level. Work for presentation in the form of a portfolio is developed through individual instruction and criticism.

**ART 211. Lettering. Credit, 3 semester hours.**

Prerequisite: Art 111.

Design and execution of basic hand lettering with pen and brush; the utilization of hand lettering and type in the design of printed matter; the use of letter forms as an element of visual design.

## Business Administration

**BA 101. Legal Concepts. Credit, 3 semester hours.**

Contract law as a foundation for anticipating legal difficulties and for making the best use of legal advice. Functional and policy problems in the legal resolution of a controversy. The origin and development of common, statutory, and constitutional law and of the functioning of the judicial system.

**BA 102. Business Law. Credit, 3 semester hours.**

Agency, partnerships, corporations, and legal aspects of marketing.

**BA 105. Principles of Marketing. Credit, 3 semester hours.**

The fundamental functions of marketing involving the basic principles of the flow of goods and services from producer to consumer. Marketing methods, policies, and problems of the manufacturer, wholesaler and retail dealer are reviewed through analysis of channels of distribution, price policies, competition, and market information.

**BA 107. Advertising and Promotion. Credit, 3 semester hours.**

Prerequisite: BA 105 or equivalent.

The design, management and evaluation of the various communications programs involved in marketing and public relations.

**BA 113. Business Finance. Credit, 3 semester hours.**

Brief study of the unincorporated business enterprise. The modern corporation. Basic security types of stocks and bonds, capital structure, promotion, investment, banking, government regulation, administration, sources and uses of working capital, expansion, combinations, mergers, refinancing and recapitalization, failure and reorganization.

**BA 125. Management and Organization. Credit, 3 semester hours.**

The business organization, stressing the conceptual foundations of business. Ethical and behavioral issues in organizing. The authority, responsibility, and accountability in organization and management which underlie businesses of every legal form.

**BA 203. Physical Distribution Management. Credit, 3 semester hours.**

Prerequisite: Junior standing.

Planning, organization, management, and operation of logistics systems with emphasis on the effective use of transportation to meet the objectives of a business.

**BA 216. Statistics. Credit, 3 semester hours.**

Prerequisites: M 116 or equivalent.

Statistical populations, parameters for decision, sample selection and distribution, probability theory, risk and uncertainty in estimation and testing problems, data flow, and error and bias occurring in sampling.

**BA 227. Risk and Insurance. Credit, 3 semester hours.**

The importance of risk in business affairs; risk situations analyzed; the different methods of meeting risk considered; extended consideration given to the various forms of insurance coverage.

**BA 229. Financial Management. Credit, 3 semester hours.**

Prerequisite: BA 113.

Analytical techniques for dealing with financial problems and their application to corporate financial management. Capital budgeting, cost of funds, capital structure, valuation, and some aspects of investment problems.

**BA 231. Industrial Relations. Credit, 3 semester hours.**

Prerequisite: BA 125.

Human factors in the management function including union-management relations, history of human relations, individual and group productivity, the company, and the community.

**BA 301. Retailing. Credit, 3 semester hours.**

Prerequisite: BA 105.

Modern merchandising methods used by retail stores, including store organization, buying, pricing, receiving, marketing, publicity, selling, record keeping, and stock control.

**BA 302. Industrial Marketing. Credit, 3 semester hours.**

Prerequisite: BA 105.

Practices and policies in the distribution of industrial goods, including purchasing practices, market analysis, channels of distribution, distribution and pricing policies, competitive practices, and operating costs.

**BA 312. International Business. Credit, 3 semester hours.**

Prerequisite: BA 105.

Principles of International Marketing; the theory of trade and commercial policy; foreign exchange rates, exchange control, and foreign investments; world trade in commodities; methods of exporting and importing; and an evaluation of comparative distribution systems.

**BA 315. Marketing Management. Credit, 3 semester hours.**

Prerequisite: BA 105.

Policies, practices, and problems in the field of marketing management; product development; product planning for promotion; market investigation, quantitative and qualitative; pricing and price policies; planning the marketing effort; and control of marketing operations.

**BA 316. Sales Management. Credit, 3 semester hours.**

Prerequisite: BA 105.

The problems and resulting policies encountered in the management of a sales organization. The qualifications and the duties of the sales manager; departmental organization; recruiting, selecting, training, stimulating, supervising, compensating, and routing salesmen; and territories, quotas, expenses, promotion, and policies.

**BA 333. Advanced Statistics. Credit, 3 semester hours.**

Quantitative analysis of business problems, development and testing of statistical inferences, and Bayes's theorem to revise probabilities in the light of information obtained from statistical studies.

**BA 342. Marketing Research. Credit, 3 semester hours.**

Prerequisites: BA 105 and BA 216.

The use of qualitative and quantitative analysis of the markets in which business operates. Sales analysis, advertising research, product planning and analysis, sources of data and methods of their collection, sampling techniques, methods of tabulation and analysis, methods of organizing and conducting marketing research, budget considerations, etc. with outside readings and term reports.

**BA 510. Managerial Economics. Credit, 3 semester hours.**

Prerequisite: Senior standing.

Integrates principles and concepts from the several business and economic fields to exemplify decision processes and strategies applicable to the management of the individual firm.

**BA 512. Seminar. Credit, 3 semester hours.**

Prerequisite: Senior standing.

Each participant will develop a scholarly paper involving independent study and research under faculty guidance.

## Chemistry

**CH 103. Introduction to General Chemistry w/Lab. Credit, 3 semester hours.**

Cannot be taken for credit by science and engineering majors.

Introductory course in inorganic chemistry dealing with elements, compounds, reactions, atomic structure, chemical bonding, solutions, and nuclear reactions. The laboratory work involves weighing and experiments related to the material covered in the lectures.

Laboratory and Breakage Fee: $15.00.

**CH 105. General Chemistry I w/Lab. Credit, 4 semester hours.**

Prerequisite: CH 103 or one high school unit of chemistry, or written qualifying examination.

Application of nuclear reactions, thermochemistry, electrochemistry, the production and properties of metals, the properties of the halogen and sulfur groups, and organic chemistry. Laboratory work will be related to the material covered.

Laboratory and Breakage Fee: $15.00.

**CH 106. General Chemistry II w/Lab. Credit, 4 semester hours.**

Prerequisite: CH 105.

Chemical equilibria, chemical bonding, solutions, chemical structure, kinetic theory, and coordination chemistry. Laboratory work includes some experiments in qualitative analysis and other experiments related to the subjects in the curriculum.

Laboratory and Breakage Fee: $15.00.

**CH 211. Quantitative Analysis w/Lab. Credit, 4 semester hours.**

Prerequisite: CH 106.

Theory and laboratory training in the preparation of solutions, volumetric and gravimetric analysis, and the use of special laboratory instruments.

Laboratory and Breakage Fee: $15.00.

**CH 301-302. Organic Chemistry w/Lab. Credit, 8 semester hours.**

Prerequisite: CH 106.

Resonance and molecular orbital theory, and basic organic reactions as they apply to synthetic procedures.

Laboratory and Breakage Fee: $15.00 per semester.

**CH 321-322. Plastics and Polymer Chemistry. Credit, 6 semester hours.**

Prerequisites: CH 106, CH 302.

All phases of the plastics and polymers field, including the chemistry involved, methods, properties of the plastics, and uses of the various materials.

**CH 341. Instrumental Methods of Analysis w/Lab. Credit, 4 semester hours.**

Prerequisites: CH 106, CH 211.

Theory of instrumental methods such as colorimetry, spectrophotometry, chromatography, and polarography. The demonstration of various instrumental methods.

Laboratory and Breakage Fee: $15.00.

**CH 351. Qualitative Organic Chemistry w/Lab. Credit, 4 semester hours.**

Prerequisite: CH 302.

A one-semester laboratory course dealing with the systematic identification of organic compounds.

Laboratory and Breakage Fee: $15.00.

**CH 361. Nuclear and Radiochemistry. Credit, 3 semester hours.**

Prerequisites: CH 106, M 117.

Natural and induced radioactivity, nuclear reactions, and the chemistry of fission products. Methods of detecting and measuring nuclear radiation. The various applications of radiochemistry in industry and the chemical effects of radiation.

**CH 401-402. Advanced Organic Chemistry. Credit, 6 semester hours.**

Prerequisite: CH 302.

The mechanism of organic reactions, advanced problems in synthetic organic chemistry, and special topics such as stereochemistry and photochemistry.

**SC 411-412. Biochemistry w/Lab. Credit, 8 semester hours.**

(See under Science.)

**CH 421-422. Advanced Inorganic Chemistry w/Lab. Credit, 8 semester hours.**

Prerequisite: CH 431. Corequisite: CH 432.

Modern structural concepts, reaction mechanisms, the application of principles of physical chemistry and bonding theory in inorganic chemistry.

Laboratory and Breakage Fee: $15.00 per semester.

**CH 431-432. Physical Chemistry w/Lab. Credit, 8 semester hours.**

Prerequisites: CH 106, PH 202, and M 203.

Fundamental laws of gases, thermodynamics, the theory of atomic and molecular structure, kinetics, and phase equilibria. Laboratory work enables the student to evaluate this subject by studying physical and chemical data.

Laboratory and Breakage Fee: $15.00 per semester.

**CH 441. Analytical Chemistry w/Lab. Credit, 4 semester hours.**

Prerequisite: CH 431. Corequisite: CH 432.

Application of instrumental methods to inorganic and organic methods of analysis. The instrumental methods include mass, ultraviolet and infrared spectrophotometry, chromatography, and electro-analytical analysis.

Laboratory and Breakage Fee: $15.00.

**CH 451-452. Thesis for Undergraduate Chemistry Majors w/Lab. Credit, 4 semester hours.**

Prerequisites: CH 302, CH 432.

An original investigation in the laboratory under the guidance of a member of the department. Oral discussion of the completed work before the staff at the end of the second semester. Final thesis report. Required for all senior majors in chemistry.

Laboratory and Breakage Fee: $15.00 per semester.

**CH 511-512. Seminar I and II. Credit, 2 semester hours.**

Prerequisites: CH 302, CH 432.

Reports and discusions in various fields of chemistry reviewed by students and staff.

**Plant Visitations. Credit, none.**

Open to junior and senior chemistry majors. Visits to plants in the area to investigate plant and laboratory facilities in the chemical industry.

## Economics

**EC 133. Principles of Economics I. Credit, 3 semester hours.**

The foundations of economic analysis, including economic progress; resources, technology, private enterprise, profits and the price system. Macroeconomics including national income, employment and economic growth. Price levels, money and banking, the Federal Reserve System, theory of income, employment and prices, business cycles and problems of monetary, fiscal, and stabilization policy.

**EC 134. Principles of Economics II. Credit, 3 semester hours.**

Prerequisite: EC 133.

Microeconomics including markets and market structure and the allocation of resources. The distribution of income, the public economy, the international economy, and current economic problems.

**EC 300. Economic History of the U. S. Credit, 3 semester hours.**

The development of American economic life in the various stages of agriculture, trade, industry, finance, and labor. The change of economic practices and institutions, particularly in business, banking, and labor. The changing role of government.

**EC 310. Principles of Economic Geography. Credit, 3 semester hours.**

The distribution of resources, industries, and population in relation to physical, economic and technological factors. The principles of economic location and regional development.

**EC 311. Government Regulation of Business. Credit, 3 semester hours.**

Prerequisites: EC 133-134.

An appraisal of public policy toward transportation, trusts, monopolies, public utilities, and other forms of government regulation of economic activity.

**EC 314. Public Finance. Credit, 3 semester hours.**

Prerequisites: EC 133-134.

The theory and practice of public taxation. The budgetary process at all levels of government.

**EC 320. Mathematical Methods in Economics. Credit, 3 semester hours.**

Prerequisites: M 115-116.

The applications of various mathematical concepts and techniques in macroeconomic and microeconomic analysis. Special emphasis on the design and interpretation of mathematical models of economic phenomena.

**EC 336. Money and Banking. Credit, 3 semester hours.**

Prerequisites: EC 133-134.

The nature and functions of money, commercial banking system, Federal Reserve System and the Treasury, monetary theory, financial institutions, international financial relationships, history of money and monetary policy in the United States, and current problems of monetary policy.

**EC 340. Intermediate Economic Analysis. Credit, 3 semester hours.**

Prerequisites: EC 133-134.

The theory of product and factor pricing in markets. The uses and limitations of some general methods of economic analysis. Recommended for students planning to take advanced-level studies in economics.

**EC 342. International Economics. Credit, 3 semester hours.**

Prerequisites: EC 133-134.

The role, importance, and currents of international commerce; the balance of international payments; foreign exchange and international finance; international trade theory; problems of balance of payments adjustment; trade restrictions; international control of raw materials; economic development and foreign aid.

**EC 345. Comparative Economic Systems. Credit, 3 semester hours.**

Prerequisites: EC 133-134.

A comparative study of the economic organization, resource allocation and growth problems of the United States, British and French economic systems and the economic systems of the U.S.S.R., Poland, and Yugoslavia.

**EC 350. Economics of Labor Relations. Credit, 3 semester hours.**

Prerequisites: EC 133-134.

The history of the union movement in the United States, union structure and government, problems of collective bargaining, economics of the labor market, wage theories, unemployment, governmental policy and control, problems of security.

**EC 410. Econometrics. Credit, 3 semester hours.**

Prerequisite: EC 320.

The application of mathematical and statistical methods to both micro- and macroeconomic policy issues.

**EC 440. Economic Development. Credit, 3 semester hours.**

Prerequisites: EC 133-134.

Economic problems of underdeveloped countries and the policies necessary to induce growth. Individual projects required.

**EC 442. Economic Thought. Credit, 3 semester hours.**

Prerequisites: EC 133-134.

The development of economic doctrine from mercantilism and Adam Smith to the thinking of modern-day theorists. Emphasis is placed upon the main currents of thought with the applicability to present-day problems. Individual study and reporting.

**EC 445. National Income Analysis and Business Cycles. Credit, 3 semester hours.**

Prerequisites: EC 133-134, EC 336.

An investigation of the make-up of the national income and an analysis of the factors that enter into its determination; the nature of economic fluctuations and a survey of theories explaining the causes of cycles in general economic activity; counter-cyclical policies; unemployment and economic growth; forecasting economic activity.

**EC 450. Thesis. Credit, 3 semester hours.**

The undertaking of a written report on a research project. No class meetings, but periodic conferences with the thesis supervisor. Required of all majors.

## Electrical Engineering

**EE 223-224. Principles of Electrical Engineering. Credit, 6 semester hours.**

Prerequisites: PH 209 and M 203 may be taken concurrently.

Basic concepts in modern network theory and network techniques in analyzing simple and complex electric circuits. Definitions of current voltage relations, circuit elements, resistance, inductance, and capacitance. Circuit equilibrium equations, transformation, Kirchoff's laws, network theorems, passive and active networks, superposition. Thevenin and Norton's theorem, d-c transients, solution of simple electric circuits in the sinusoidal steady state by vector and complex algebra. Impedance, capacitance, and resonance concepts, single phase alternating currents and voltages, power relations. Electron devices, diodes, triodes and transistors, amplifiers, equivalent circuits, and applications. Magnetic fields and circuits, electromechanical energy conversion.

**EE 235. Principles of Energy Conversion. Credit, 3 semester hours.**

Prerequisite: EE 224.

Cannot be taken for credit by electrical engineering students.

Analysis of basic electric phenomena to fulfill the conversion of energy. General form of the machine: windings, voltage relations, magnetic-field relations, energy losses, energy flow, efficiency, ratings and basic torque relations. The application of these basic principles and relations to the detailed analysis of the performance of the different types of machines.

**EE 252. Illumination. Credit, 3 semester hours.**

Prerequisite: EE 224.

Basic concepts of illumination engineering; light sources; photometry; seeing; principles of illumination; illumination calculations; interior lighting; flood lighting; sport, street, highway lighting; interior wiring for light and power.

**EE 330. Introduction to Automation. Credit, 3 semester hours.**

Prerequisites: EE 336 and M 204.

The fundamental principles of automation for industrial engineers. Provides an introduction to the mathematics and techniques of automation for non-electrical engineers as well as a firm foundation in mathematics, physics, chemistry, and technology for electrical engineers who plan to pursue the subject further. Problems and equipment demonstrations will accompany class assignments.

**EE 331-332. Alternating Current Circuits. Credit, 6 semester hours.**

Prerequisites: EE 224 and M 204.

Review of basic current theory. Loop and nodal equations and methods of solution. Matrix notation. General network theorems. Input and transfer admittances, impedances and transfer functions. Symmetrical component analysis. Three-phase circuits, balanced and unbalanced. Other polyphase circuits. Fourier series and integrals. Fourier and LaPlace transforms, direct and inverse. Operational methods applied to transients in linear systems.

**EE 336. Instrumentation Electronics. Credit, 3 semester hours.**

Prerequisites: EE 224 and M 204.

Cannot be taken for credit by electrical engineering students.

An introduction into instrumentation electronics aiming to provide a working knowledge and understanding of electronic instruments and controls as used in industrial processes. Starting with simple electrical measurements, the course subsequently deals with power supplies, transistor and vacuum tube amplifiers, and oscillators. Practical servo systems and operational amplifiers are treated, as well as simple circuits for electronic switching, timing, and digital counting.

**EE 343-344. Electrical Machines. Credit, 6 semester hours.**

Prerequisites: EE 224 and EE 331-332, which may be taken concurrently.

Processes for the electro-mechanical conversion of energy. The fields, forces, and torques in magnetic systems. Theory, characteristics, applications, and design of direct-current machines. Theory, performance, and applications of transformers, AC generators, synchronous motors, single and polyphase induction motors.

**EE 345. Automatic Control Theory and Practice. Credit, 3 semester hours.**

Prerequisites: EE 336 or EE 347 and M 204.

Fundamentals of automatic control and simulation of control systems as applied to electrical, mechanical, hydraulic and pneumatic systems found in the scientific, military, and industrial fields. Analysis and representation of system dynamics by block diagrams and LaPlace transforms, transient and frequency response analysis, open and closed loop analysis, tuning of control systems, and stability criteria. Laboratory sessions using the analog computer provide students with first-hand experience with the principles used in automatic control systems.

**EE 347-348. Electronic Devices and Circuits. Credit, 6 semester hours.**

Prerequisite: EE 332, or may be taken concurrently.

Study of basic circuits making up more complex electronic systems. The first semester includes semiconductor junctions, vacuum diodes and triodes, transistors, and basic amplifier circuits. Power and audio amplifiers, high frequency circuits, and negative resistance devices analyzed in the second semester.

**EE 349-350. Electronics Laboratory. Credit, 2 semester hours.**

To be taken concurrently with EE 347-348.

Laboratory experiments and problems associated with circuits and devices covered in the lecture courses.

Note: Part-time students are charged for a standard 3 semester hour course.

**EE 351. System Analysis. Credit, 3 semester hours.**

Perequisites: EE 224 and M 303. (M 303 may be taken concurrently.)

A study of the analytical approach to the solution of electrical engineering problems. Review of differential equations and systems applications. Circuit response to special functions. Dual networks. Electrical analogues to mechanical systems. Fourier methods and applications in linear systems. Transfer functions and system response by LaPlace transforms. Convolution and superposition integrals.

**EE 352. Advance Network Theory. Credit, 3 semester hours.**

Prerequisite: EE 351.

Introduction to the concept of matrices and their application to modern electrical circuits and system phenomena. The theory of n-port and n-terminal networks. Their synthesis and analysis from the admittance matrix viewpoint, using RLC networks, transformers, negative-immittance converters, and gyrators.

**EE 353-354. Electrical Machines Laboratory. Credit, 2 semester hours.**

To be taken concurrently with EE 343-344.

The laboratory experiments and problems cover analysis of DC and AC networks by loop and nodal equations and methods of solutions. Matrix notation. Experimental verification of network theory and its application to electrical machines.

Note: Part-time students are charged for a standard 3 semester hour course.

**EE 429. Measuring Principles and Transducers. Credit, 3 semester hours.**

Prerequisites: EE 336, M 204, EE 330 or EE 332.

The principles of measuring elements and transducers for electrical engineers. Mechanical and industrial engineers who have the necessary prerequisites will also be able to profit from the course. An introduction to the science of measurement (Metrology) and the application of this science to the measurement of quantities of economic value in industrial, military, and scientific processes. Laboratory sessions provide the student with first-hand familiarization of the principles of the subject.

**EE 437. Industrial Power Systems Engineering. Credit, 3 semester hours.**

Prerequisite: EE 332.

Structure of power and distribution of systems; symmetrical components; analysis of unbalanced polyphase power systems; fault calculations; applications to problems of grounding, relaying, and unbalanced operation of apparatus.

**EE 438. Electric Power Transmission. Credit, 3 semester hours.**

Prerequisite: EE 437 or EE 332.

The fundamentals of electric generation, transmission, and distribution. Transient performances of non-linear characteristic circuits, and power system stability.

**EE 441. Electronic Analog Computers. Credit, 3 semester hours.**

Prerequisite: EE 348.

Elements of analog simulation, pulses and wave shapes, operational amplifiers, integrator, differentiator, constant multiplier and summer. Solution of first-order differential equations and higher order systems, formulating of signal flow-graphs. Application of computer to problems in engineering. Lectures supplemented with laboratory work.

**EE 442. Electronic Digital Computers. Credit, 3 semester hours.**

Prerequisite: EE 348.

Fundamentals of switching circuits, number systems, Boolean algebra and its use in logical design techniques, switching theorems, minimization methods, coding, error detection and correction, storage elements, sequential circuits, arithmetic operations, and system design of general purpose digital computer. Lectures supplemented with laboratory work.

**EE 445-446. Communication Circuits. Credit, 6 semester hours.**

Prerequisite: EE 348.

The analysis of communication circuits and the design of the components of communication systems, performance testing of receivers, transmitters, power amplifiers and other elements of telephone, carrier current, telemetering, radio, microwaves, and television equipment.

**EE 450. Semiconductor Electronics I. Credit, 3 semester hours.**

Prerequisite: EE 347 or instructor's approval.

Structure and carrier density of semiconductors. Processes of current flow. Theory of PN junction diodes. Mechanism of current flow in junction transistors. Equivalent circuits and four terminal networks. Low frequency small signal amplifiers. Stability, high frequency circuits, power supply regulators, pulse and switching circuits. Lectures supplemented with laboratory work.

**EE 451. Semiconductor Electronics II. Credit, 3 semester hours.**

Prerequisite: EE 450 or instructor's approval.

Measurement of electrical quantities and parameters. Switching power supply regulators. Differential amplifiers. Operational amplifiers. Field effect transistors; analysis and design of circuits. Tunneling process. Tunnel diode and hybrid circuits. Avalanche mode switching and current mode circuits. Integrated circuits. Lectures supplemented with laboratory work.

**EE 455-456. Servomechanisms and Feedback Control Systems. Credit, 6 semester hours.**

Prerequisite: EE 352.

Differential equations of dynamical systems, analogues, linearization techniques, block diagram representation, concept of transfer function, classical servomechanisms, transient analysis and synthesis, frequency spectrum analysis and synthesis, stability criteria, transfer loci, compensation methods, use of inverse plane. Bode plot, straight line approximations, gain-phase relationships, Nyquist plots and root-locus technique. Correlation between root-locus and frequency loci, compensation using root-locus, multiple loop systems, block diagram reduction techniques, multiple systems, and the use of describing function for linearization.

**EE 461. Waves and Fields. Credit, 3 semester hours.**

Prerequisite: EE 352.

Basic electromagnetic theory as related to the static fields of electric charges and the magnetic fields of steady electric currents. Fundamental field laws. Maxwell's equations, energy distributions, scalar and vector potentials, method of images, boundary relations, magnetization, polarization, time varying electric and magnetic fields, field plotting. Vector mathematics is used in the mathematical analysis.

**EE 462. Microwave Fundamentals. Credit, 3 semester hours.**

Prerequisite: EE 461.

The development and application of electromagnetic-field theory to the analysis of high-frequency circuits, wave propagation, reflection in various media including waveguides, and resonant cavities. The theory of operation of such devices as klystron, magnetron, and traveling wave tubes.

**EE 500. Seminar in Semiconductor Electronics. Credit, 3 semester hours.**

Prerequisite: Instructor's approval.

Open to Seniors in Electrical Engineering only.

Special advanced engineering problems in the semiconductor electronics field. Arranged to suit the interest and requirements of the student, under the supervision of a staff member.

**EE 504. Laboratory Thesis. Credit, 3 semester hours.**

Prerequisite: Instructor's approval.

Open to Seniors in Electrical Engineering only.

Advanced laboratory testing and special problems. The student works on problems of his own selection which have been approved by the instructor. The student's work may be in the form of a semester thesis or a series of original experiments.

## English

**EA. Basic Grammar. One semester. No credit.**

A review of the fundamentals of English for students who do not meet the English requirements for admission to the College. Practice given in writing as well as in grammar.

**EB. Reading Laboratory. One semester. No credit.**

Helps the student to read faster with greater comprehension, to increase vocabulary, and to study more effectively. Supervised reading, training films, exercises and discussions.

Laboratory Fee: $5.00

**EF. English for Foreign Students. One semester. No credit.**

Designed for foreign-born students whose English is inadequate. Objective is to increase the student's command of English sufficiently for him to do college-level work.

**E 113. English Composition. Credit, 3 semester hours.**

Prerequisite: Satisfactory performance on English Placement Examination or completion of EA Basic Grammar.

Theme writing with emphasis on thematic content, paragraphing, sentence construction, grammatical principles, and diction. Reading of essays to stimulate thought and illustrate rhetorical principles.

**E 114. Speech. Credit, 3 semester hours.**

A disciplined approach to oral communication. Objectives are to develop proficiency in locating, organizing, and presenting material and to help the student gain confidence and fluency when speaking extemporaneously.

**E 201-202. World Literature I and II. Credit, 6 semester hours.**

Prerequisite: E 113.

Selected translations of non-Western literature and of Western literature from Homer to the present. Emphasis upon literary, cultural, and philosophical values.

**E 206. Composition and Literature. Credit, 3 semester hours.**

Prerequisite: E 113.

Further practice in theme writing. Reading of poetry, fiction, and drama in order to develop skill in analyzing and interpreting literature.

**E 211-212. Survey of English Literature I and II. Credit, 6 semester hours.**

Prerequisites: E 113, E 206.

Readings in English Literature from its beginnings to the present, with attention to its historical and social backgrounds.

**E 213. Survey of American Literature I. Credit, 3 semester hours.**

Intellectual and literary movements from Colonial times to the Civil War.

**E 214. Survey of American Literature II. Credit, 3 semester hours.**

Intellectual and literary movements from the Civil War to the present.

**E 220. Report Writing. Credit, 3 semester hours.**

Prerequisite: E 113.

Study of the standards inherent in effective reporting, both formal and informal, and of the principles of business letter writing, with practice in writing letters, memos, and reports.

**E 242. Shakespeare. Credit, 3 semester hours.**

Introduction to the most representative comedies, history plays, and tragedies of Shakespeare.

**E 267-268. Creative Writing. Credit, 6 semester hours.**

Prerequisite: E 206 and instructor's approval.

Practice in writing the short story, poetry, drama, or non-fiction; choice of genre based upon inclination and ability of the student. Analysis of published materials and student work.

**E 301. Literary Criticism and Scholarship. Credit, 3 semester hours.**

Major critical theories, with readings from Plato and Aristotle to the present. Bibliographic tools and methods of research.

**E 302. History of the English Language. Credit, 3 semester hours.**

The development and structure of English, including its Indo-European origins and the elements of Anglo-Saxon. Major emphasis on Middle English and the transition to Modern English. Some study of the distinctive coinages of American English.

**E 323. Sixteenth Century Poetry and Prose. Credit, 3 semester hours.**

The social and historical backgrounds of the English Renaissance; readings in the prose writers and in Wyatt, Surrey, Spenser, Sidney, and their contemporaries.

**E 326. English Drama to 1642. Credit, 3 semester hours.**

The development of the English drama from its beginnings to the middle of the seventeenth century, excluding Shakespeare. Major emphasis upon the Elizabethan and Jacobean drama.

**E 353. Literature of the Romantic Era. Credit, 3 semester hours.**

Poetry and prose of the major Romantics — Wordsworth, Coleridge, Byron, Shelley, Keats, Lamb, and Hazlitt — with attention given to the milieu of the writers, the Continental background and theories of Romanticism.

**E 356. Late Nineteenth Century English Literature. Credit, 3 semester hours.**

Poetry and prose from 1830-1900. The works of Tennyson, Browning, Arnold. Swinburne, Carlyle, Mill, Newman, Ruskin, and others studied in the light of the social, political, and religious problems of the period.

**E 361. Modern British Literature. Credit, 3 semester hours.**

British fiction, drama, and poetry from 1900 to the present. Includes works of Conrad, Joyce, Lawrence, Woolf, Huxley, Forster, Shaw, Yeats, Auden, Spender, and Dylan Thomas.

Major writers of prose and poetry during the period 1600-1660: Donne, Milton, Burton, Bacon, Herbert and others.

**E 362. The Age of Donne and Milton. Credit, 3 semester hours.**

Major writers of prose and poetry during the period 1600-1660: Donne, Milton, Burton, Bacon, Herbert and others.

**E 371. Literature of the Neoclassic Era. Credit, 3 semester hours.**

British writers of the period 1660-1760, with emphasis upon Dryden, Pope, Swift, Johnson, and others.

**E 375. The Age of Chaucer. Credit, 3 semester hours.**

A detailed reading and critical study of Chaucer's *Canterbury Tales,* with some study of his predecessors and the medieval cultural milieu.

**E 390. The English Novel I. Credit, 3 semester hours.**

The development of the novel in England from Defoe to Dickens and Thackeray.

**E 391. The English Novel II. Credit, 3 semester hours.**

The development of the novel in England from George Eliot and Hardy to the present.

**E 392. Literature of the American Renaissance. Credit, 3 semester hours.**

Intensive study of the writings of such figures as Emerson, Thoreau, Hawthorne, Melville, and Whitman, whose works are analyzed in the light of the influences and traditions which led to America's cultural independence.

**E 402. Modern Poetry. Credit, 3 semester hours.**

A study of the works of representative twentieth-century British, American, and Continental poets.

**E 405. Modern Drama. Credit, 3 semester hours.**

Principal movements in Continental, British, and American drama from Ibsen to the present.

**E 478. Contemporary American Literature. Credit, 3 semester hours.**

Intensive study of developments in American fiction, poetry, and drama of our time. Readings in the works of such writers as Wolfe, Malamud, Bellow, Theodore Roethke, Robert Lowell, Arthur Miller, and Tennessee Williams.

**E 491. Studies in English Literature. Credit, 3 semester hours.**

Special topics in English Literature, which may include concentration upon a single figure, a group of writers, or a literary theme. Several sections, each on a different topic, may run concurrently.

**E 492. Studies in American Literature. Credit, 3 semester hours.**

Special topics in American Literature, which may include concentration upon a single figure, a group of writers, or a literary theme. Several sections, each on a different topic, may run concurrently.

## Foreign Languages

**FR 101-102. Elementary French. Credit, 6 semester hours.**

Stresses pronunciation, aural comprehension, and basic conversation; the fundamental principles of grammar; reading comprehension. Not open to students who offer for college entrance more than one year of high school French.

**FR 201-202. Intermediate French. Credit, 6 semester hours.**

Prerequisite: French 101-102 or equivalent.

Conversation based on the reading of modern prose texts; drill in written and oral self-expression; a review of the principles of grammar.

**GR 101-102. Elementary German. Credit, 6 semester hours.**

Stresses the fundamental principles of grammar; training in pronunciation, aural comprehension and basic conversation. Some work in the language laboratory outside of class may be required. Not open to students who offer for college entrance more than one year of high school German.

**GR 201-202. Intermediate German. Credit, 6 semester hours.**

For students with two years of high school German or one year of college German. Reading comprehension (some scientific texts), advanced study of grammar, composition, and oral self-expression.

**RU 101-102. Elementary Russian. Credit, 6 semester hours.**

Fundamental principles of grammar; training in pronunciation, aural comprehension, and basic conversation. Some work in the language laboratory outside of class may be required. Not open to students who offer for college entrance more than one year of high school Russian.

**RU 201-202. Intermediate Russian. Credit, 6 semester hours.**

For students with two years of high school Russian or one year of college Russian. A review and continuation of the principles of grammar, greater emphasis on reading comprehension, further drill in written and oral self-expression.

**IT 101-102. Elementary Italian. Credit, 6 semester hours.**

Stresses pronunciation, aural comprehension, and basic conversation; instruction in the fundamental principles of grammar; training in reading comprehension. Not open to students who offer for college entrance more than one year of high school Italian.

**SP 101-102. Elementary Spanish. Credit, 6 semester hours.**

Stresses pronunciation, aural comprehension, and basic conversation; instruction in the fundamental principles of grammar; training in reading comprehension. Not open to students who offer for college entrance more than one year of high school Spanish.

**SP 201-202. Intermediate Spanish. Credit, 6 semester hours.**

Prerequisite: SP 101-102 or equivalent.

For students with two years of high school Spanish or one year of college Spanish. Conversation, advanced study of grammar and composition. Works of prominent Spanish-American authors will be read.

## History

**HS 111. Western Civilization I to 1700. Credit, 3 semester hours.**

Western Civilization from the ancient beginnings to mid-seventeenth century. The patterns of the social, cultural and political aspects of ancient, medieval, and early modern eras that have shaped the Western tradition.

**HS 112. Western Civilization II from 1700 to present. Credit, 3 semester hours.**

European history from the Enlightenment to the present. Emphasis on economic and social changes, political history, the expansion of Europe and its international effects. Nationalism, imperialism, and socialism stressed.

**HS 211. American History to 1865. Credit, 3 semester hours.**

The development of the American nation from colonial times to 1865. Significant economic, social, political, and institutional developments.

**HS 212. American History from 1865. Credit, 3 semester hours.**

United States history from the Reconstruction through the contemporary era. Expanding industrialism, the changing concepts of the role of government, and the United States in world affairs.

**HS 221. Comparative European Political Systems. Credit, 3 semester hours.**

Prerequisites: HS 111-112.

Historical comparative approach to the political institutions of the United Kingdom, U.S.S.R., Federal Republic of Germany, and France. Emphasis on the relationship between Western and Eastern political systems.

**HS 308. Social and Intellectual History of the United States. Credit, 3 semester hours.**

Prerequisites: HS 211-212.

Leading ideas that have shaped important periods of American history. The colonial mind and spirit, the democratic upheaval, sectionalism—war—and reconstruction, the industrialization of the country, religion as it met the new age of science and economics, agrarian revolt, overseas possessions, the beginning of the end of isolation.

**HS 310. The History of Modern England. Credit, 3 semester hours.**

Prerequisites: HS 111-112.

British institutions and industrial life from 1688 to the present. Traces the movement of British society from its eighteenth-century aristocratic base through the Liberal experiment of the nineteenth- to twentieth-century collectivism; England's role in international affairs.

**HS 311. American Colonial History. Credit, 3 semester hours.**

Prerequisites: HS 211-212.

The European background for the discovery and colonization of the New World, and the history of the British colonies in North America until Independence. The transformation of transplanted institutions within the American environment.

**HS 312. The U. S. in the Twentieth Century. Credit, 3 semester hours.**

Prerequisites: HS 211-212.

Political history, social trends, and intellectual movements. Study of the expansion of the functions of government to meet modern complex problems arising from social and cultural trends and from the involvement of the United States in global politics.

**HS 314. The History of Germany from 1648. Credit, 3 semester hours.**

Prerequisites: HS 111-112.

From the Treaty of Westphalia to the unification of Germany, the imperial era, the two World Wars, and the rise and fall of National Socialism to the problems of divided Germany today.

**HS 315. The History of Europe in the Nineteenth Century. Credit, 3 semester hours.**

Prerequisites: HS 111-112.

The main political, economic, and intellectual trends in Europe in the period from 1815 to 1914. The effects of industrialism, liberalism, and socialism on European society and culture. In international affairs, the impact of nationalism on European power politics and the failure of the major powers to resolve their differences in the Balkans.

**HS 317. Renaissance and Reformation. Credit, 3 semester hours.**

Prerequisites: HS 111-112.

Economic, political, intellectual, and religious developments in Continental Europe from 1300 to 1650; intellectual and social change during the transition from medieval to modern times; dynastic conflicts within the emerging state system.

**HS 321. The History of Ancient Greece and Rome. Credit, 3 semester hours.**

Prerequisites: HS 111-112.

From the Homeric period to the year 500 A.D. Events, institutions, and ideas that have shaped the Western tradition. The political, social, economic, and cultural problems that caused the decline of these civilizations.

**HS 330. History of Russia. Credit, 3 semester hours.**

Prerequisites: HS 111-112.

From the thirteenth century, with particular emphasis on the transition from an agrarian to an industrial society in the period since the emancipation of the serfs in 1861. The role of the U.S.S.R. in world affairs since the Revolution of 1917; its impact upon Asia and the West.

**HS 401. Europe in the Twentieth Century. Credit, 3 semester hours.**

The history of Western and Central Europe since World War I viewed from the perspective of Europe's rapidly changing role in world history. Europe's political, social, and economic adjustment to the Russian Revolution and Nazism, the emergence of America and Russia as super-powers, and the loss of overseas possessions.

**HS 406. Modern Japanese History. Credit, 3 semester hours.**

The institutional and cultural traditions of Japan, the nature of Japan's feudal society after 1600, and the interplay of indigenous and foreign elements in the changes which affected thought, politics, and society. After the coming of Perry, the adoption and reflection of parliamentary government and the reforms that followed World War II.

**HS 407. Colonial and Early Latin America. Credit, 3 semester hours.**

Prerequisites: HS 111-112, 211-212.

European and Indian origins, the formation of a colonial society and culture in the sixteenth and seventeenth centuries, the background and course of anti-colonial upheaval in the early nineteenth century, the problems from the post-independence period to 1890.

**HS 408. The History of Modern Latin America. Credit, 3 semester hours.**

Prerequisites: HS 111-112, 211-212.

Latin America since 1890, including the distinctive histories of the major nations of Mexico, Brazil, Argentina, and Chile as well as the characteristics, problems, and prospects of the area as a whole. Inter-American relations and current revolutionary movements.

**HS 409. Modern Chinese History. Credit, 3 semester hours.**

The traditional society as it existed prior to the Opium War, China's confrontation with the West and its effect on political, intellectual, and economic developments. The formation and evolution of the present Chinese regime.

**HS 410. A History of the Middle East. Credit, 3 semester hours.**

The rise and spread of Islam and the development of an Arabic civilization. Primary attention on Turkey, Egypt, and Iran, the problems created by the Western impact on the peoples and governments of the area, the effect of the Zionist movement on Middle East politics.

**HS 412. The British Empire and Commonwealth. Credit, 3 semester hours.**

Prerequisites: HS 111-112.

The origins and development of the British Empire in its major areas and the emergence of the modern Commonwealth of Nations. The second part of the course will deal exclusively with Canadian history from the time of discovery to the present; stress on nineteenth- and twentieth-century developments including Canadian-United States relationships.

**HS 413. A History of Africa in Modern Times. Credit, 3 semester hours.**

Morocco, Algeria, Tunisia and Libya, stressing the institutional histories of these countries, which enabled them ultimately to expel European imperialism. The second part of the course deals with nineteenth-century Africa, the partition of Sub-Sahara Africa by the European powers, the period of colonial domination, and the emergence of the independent states after 1945.

**HS 415. Historiography. Credit, 3 semester hours.**

The development of schools of historical thought and interpretation from Thucydides to Toynbee.

**HS 416. Thesis. Credit, 3 semester hours.**

The undertaking of a written report on a research project. No class meetings but periodic conferences with a thesis supervisor. Required of all majors.

## Industrial Engineering

**IE 102. Introduction to the Computer. Credit, 3 semester hours.**

Prerequisites: M 002 or equivalent.

Introductory subject to prepare students to make effective use of the computer. The basic concepts of machines which process information, stored program concepts, programming language and systems.

Laboratory Fee: $3.00

**IE 105. Technical Data Processing. Credit, 3 semester hours.**

Prerequisite: M 002 or equivalent.

Basic course in statistical data handling, hardware and software tools, development of computers and programming. Develops the peripheral computer structures as well as introducing scientific programming.

**IE 114. Management Survey. Credit, 3 semester hours.**

Introductory course in management. The major functions of industry, their interrelationship, and how they are brought together through organization. Instruction in the preliminaries of methods, cost, production control, product development, finance, physical facilities, quality control, plant engineering, industrial relations, job evaluation, sales, advertising, budgets, and records.

**IE 204. Engineering Economics. Credit, 3 semester hours.**

Prerequisite: M 116 or M 117.

A quantitative analysis of applied economics in engineering practice; the economy study for comparing alternatives; interest formulae; quantitative methods of comparing alternatives; intangible considerations; selection and replacement economy for machines and structures; break-even and minimum cost points; depreciation; relationship of accounting to the economy study; review of current industrial practices. Promotes logical decisions through the consideration of alternative courses of action.

**IE 214. Management Theory. Credit, 3 semester hours.**

Prerequisite: Junior or Senior Status.

Provides insight into the elements of the managerial process and develops a rational synthesis of the mass of detail comprising the subject matter of management. Focusing largely upon the complex problems of top and middle-level management, this course investigates what managers do under given circumstances, yet stresses the on-going activities of management as part of an integrated, continuous process.

**IE 221. Data Processing. Credit, 3 semester hours.**

Presents the basic principles of Data Processing and points out their application on the current Data Processing Systems of the business and science community. These principles highlight the underlying unity that exists in manual, punch-card, and electronic data processing systems. The student is introduced to punch cards, punch card data processors, and the fundamental knowledge concerning the nature and the use of modern-day electronic computers.

**IE 223. Personnel Administration. Credit, 3 semester hours.**

Prerequsites: IE 114 and IE 214 or BA 125.

Provides a foundation in fundamental concepts and a general knowledge of techniques in the administration of personnel relations. The nature of personnel administration, the handling of personnel problems, employee attitudes and morale. Techniques of personnel administration: recruitment, interviews, placement, training, employee rating, as well as wage policies and administration. In order to secure breadth and depth in the approach to personnel problems, simple case studies are used at appropriate points throughout the course.

**IE 224. Programming. Credit, 3 semester hours.**

Prerequisites: IE 102, IE 105 or IE 221, M 117 or M 227.

Introduces the student to computer programming, starting with the preparation of block diagrams, program coding, program compiling, and debugging. At least two different programming languages are learned and actual jobs programmed. The programs, written by the students, are then tested and debugged on a computer.

Laboratory Fee: $8.00.

**IE 233. Cost Control. Credit, 3 semester hours.**

Prerequisites: A 112 or A 113, M 115.

Basic analysis of cost control techniques. Designed to give members of the management team the underlying rudiments of cost control systems they will be using and by which they will be measured and controlled. Theory of standard costs, flexible budgeting, and overhead handling techniques emphasized by analytical problem solution.

**IE 234. Production Control. Credit, 3 semester hours.**

Prerequisites: IE 114, IE 214 or BA 125, M 116.

The basic principles that govern production control in an industrial plant. These principles are worked out in the problems of procuring and controlling materials, in planning, routing, scheduling, and dispatching. Familiarizes the student with present and new methods used in this field, including O. R. techniques.

**IE 241. Methods and Motion Study. Credit, 3 semester hours.**

Prerequisites: IE 114, IE 214 or BA 125, M 116.

Develops an acute awareness of motion economy and an understanding of the principles of methods analysis in industrial operations. Each student is responsible for a project based on a practical shop operation. Through analysis, he will demonstrate the principles of motion economy. Methods analysis techniques include operations analysis, man-machine, gang and operator process charts. Motion study techniques include micromotion filming and analysis of student projects, memomotion filming and synthetic basic motion study analysis. Job analysis and job evaluation techniques introduced and applied to actual industrial labor problems.

Methods Laboratory and Breakage Fee: $5.00.

**IE 342. Work Measurement. Credit, 3 semester hours.**

Prerequisite: IE 241.

A basic course in the measurement of work by the stopwatch and synthetic basic motion systems. Actual shop operations analyzed in the laboratory for elemental breakdown. Performance rating practiced from films and from actual shop operations. The various techniques of applying allowances and developing the standard time practiced. Standard data developed from laboratory studies and applied to formula construction and application. Work sampling techniques demonstrated and applied. Establishing of standards on indirect work, extensive application of time standards, and a survey of significant wage payment plans.

**IE 346. Statistical Analysis. Credit, 3 semester hours.**

Prerequisite: M 203.

Provides an introduction to the application of statistical techniques to industrial and engineering problems, probability and distribution theory, measures of central tendency and dispersion in relation to population and samples, as well as applications of algebraic methods in industrial practice, including advanced statistical methods.

**IE 351. Synthetic Motion-Time Systems. Credit, 3 semester hours.**

Prerequisite: IE 241.

The Methods-Time-Measurement and the Elemental Time Standards systems of work measurement. The theory and technique learned in the classroom are practiced in the laboratory in measuring actual factory operations. These applications are extended to illustrate standard data usage, standard cost methods, and the principles of motion economy.

**IE 436. Quality Control. Credit, 3 semester hours.**

Prerequisite: IE 346.

Economics of quality control; modern methods used by industry to achieve quality of product; preventing defects; organizing for quality; locating chronic sources of trouble; co-ordinating specifications, manufacturing, and inspection; measuring process capability, using inspection data to regulate manufacturing processes; control charts; selection of modern sampling plans.

**IE 443. Factory Planning. Credit, 3 semester hours.**

Prerequisites: IE 342, IE 204.

Factors in plant location, design, and layout of equipment. The basic principles of obtaining information essential for carrying out such investigations. Survey of such practices as material handling, storage and storeroom maintenance, and use of service departments in modern factories.

**IE 502. Operations Research. Credit, 3 semester hours.**

Prerequisite: BA 216 or IE 346.

The Operations Research area is oriented to various mathematical and near-mathematical methods for getting answers to certain kinds of business problems. Simulation including Monte Carlo, queuing, the Flood method for assigning jobs, the transportation method, and linear programming including the simplex method with both algebraic solution and tableaus.

**IE 504. Laboratory—Thesis. Credit, 3 semester hours.**

Prerequisite: Senior I.E. status.

Advanced laboratory testing and special problems. The student works on problems of his own selection which have been outlined by him and have received approval. They may be in the form of a semester thesis or a series of original experiments.

**IE 507. Systems Analysis. Credit, 3 semester hours.**

Prerequisites: IE 114, IE 214 or BA 125, M 116, Senior Status.

Presents the analytical and conceptual techniques upon which systems analysis and systems engineering are based and their applications in the business, engineering, and scientific fields. Development of case studies and their applications independently oriented to the student's major program.

**IE 510. Business Games. Credit, 3 semester hours.**

Prerequisites: IE 114, IE 214 or BA 125, BA 216 or IE 346.

The Business Games area gives the student the opportunity of correlating his entire course of study in a management simulation framework. These training games make use of simulation models that explore specific management areas in depth. Operations research techniques of scientific management are developed. The purposes of these games are as follows: (1) to serve as a framework for training sessions in basic management principles; (2) to serve as an introduction to the problem of manufacturing management; (3) to serve as a focal point for management development discussion of long-range planning and decision assisting tools; (4) to show the student the use of modern electronic computer methods.

## Journalism

**J 101. Journalism I. Credit, 3 semester hours.**

A survey of journalism designed to acquaint students with the profession. The American newspaper as a social institution and a medium of communication. The reporting of public affairs and elementary editing.

**J 102. Journalism II. Credit, 3 semester hours.**

Prerequisite: J 101.

The basic principles of journalism and the organizational patterns of the mass media. The gathering of journalistic stories and the writing of general, simple, complex, and feature stories.

**J 201. News Writing and Reporting. Credit, 3 semester hours.**

Prerequisites: J 101, E 113.

The elements of news, the style and the structure of news stories, news gathering methods, copyreading and editing. Practical experience in reporting, writing, and editing.

**J 301. Advanced Journalism and Feature Writing. Credit, 3 semester hours.**

Prerequisite: J 201.

Theory of copyreading, editing, feature writing, headline writing, and reporting. Practical problems.

## Law Enforcement

**PA 103. Police Organization and Administration I. Credit, 3 semester hours.**

A general study of police organization followed by a detailed study of police administration; includes coordination of all branches of a large police department. An evaluation of line, staff, and auxiliary functions and the interrelationship and interdependence of each. The utilization of planning, analysis, and operations units as administrative aids. Situations calling for maximum police effort are explained along with scientific illustrations.

**PA 104. Police Organization and Administration II. Credit, 3 semester hours.**

A detailed study of police organization and procedures within a police department and consideration of the principles of organization and methods adopted by progressive departments to insure effective service to the community.

**PA 106. Police Supervision. Credit, 3 semester hours.**

Prerequisites: PA 103-104.

Supervisory problems within a police organization and the equating of sound principles of human relations and supervisory techniques to effective police performance. Course includes such topics as discipline, leadership, motivation, conference leadership, instruction, and training as well as a discussion of other tools and devices available to the supervisor in achieving departmental aims and objectives.

**PA 201. Introduction to Forensic Science. Credit, 3 semester hours.**

Prerequisite: PA 215.

A classroom lecture-discussion session and a practical laboratory period. Forensic Science (Criminalistics): the observation, collection, positive identification, and preservation of physical, chemical, and biological evidence for court presentation. The connection between the evidence found at the crime scene and the identification, apprehension, and conviction of the criminal. Fingerprints, identification of hairs and fibers, chemicals, narcotics, blood, semen, glass, soil and wood. Imprint and impression taking, bullet comparison, document examination, and various photographic methods.

**PA 211. Applied Police Psychology. Credit, 3 semester hours.**

Prerequisites: PA 103, PA 104, and P 111.

Examines the several personality factors that enter into the police-public relationship, together with the resulting implications for obstructing democratic and efficient police service. Tensions found in the community are discussed along with consequent police problems, especially in terms of crowd and mob situations.

**PA 215. Principles of Investigation. Credit, 3 semester hours.**

Prerequisites: PA 103-104.

An introduction to criminal investigation in the field. Conduct at the crime scene, interview and interrogation of witnesses and suspects, the use of informants and the techniques of surveillance. The special techniques employed in particular kinds of investigation as well as presentation of the police case in court.

**PA 217-218. American Legal System I and II. Credit, 6 semester hours.**

Prerequisites: PA 103-104.

The process through which justice is administered. History of the American Legal System. The Constitution of the United States as it applies to police forces. Also, rules of evidence with attention given to judicial notice, presumptions, the nature of real and circumstantial evidence, burden of proof, province of court and jury, documentary evidence, hearsay evidence, confessions, and admissions of witnesses. Particular emphasis will be given to evidence in criminal cases, presumptions of the penal law, the status of illegally obtained evidence, wire tapping, character evidence, proof of other crimes, admission of memorandum book entries, dying declarations, and involuntary confessions.

**PA 221. Juvenile Delinquency. Credit, 3 semester hours.**

Prerequisites: PA 103-104.

A general orientation to the field of delinquency and crime, including all aspects of the social and personal matrix out of which these forms of social destructiveness arise. An attempt is made to build up some consistent theory of causation in order to develop a suitable method of handling these serious problems.

**PA 303-304. Forensic Laboratory I and II. Credit, 6 semester hours.**

Greater attention given to specific topics and to laboratory testing and identification than in PA 201 (Introduction to Forensic Science). In the classroom the laboratory or practical procedures are outlined and discussed. The laboratory work involves testing and identification of evidence and more detailed procedures are undertaken than in PA 201. An example would be the casting of hairs and fibers for microscopic identification of material as containing a narcotic or blood.

Laboratory and Breakage Fee: $15.00 per semester.

**PA 311. Criminology. Credit, 3 semester hours.**

Prerequisite: SS 113.

The nature and causation of crime. Approaches to the study of crime, its treatment and prevention. The sociology of criminal law and the nature of criminal behavior; theories and research.

**PA 401. Police Problems Seminar. Credit, 3 semester hours.**

Prerequisite: Can be taken only in the senior year of the Bachelor Degree Program.

An analysis of major police problems from the viewpoint of both the administrator and the line operations officer. Seeks the integration of established scientific knowledge with practical police experience.

**PA 402. Police-Community Relations. Credit, 3 semester hours.**

Prerequisites: SS 113 and Elective Course.

Designed to put the police and the community in a broad theoretical context. Sociological and environmental implications examined. Attention given to police practices which have caused much public hostility and which have isolated law enforcement from the rest of society.

## Mathematics

**M 001. Mathematics Review I. No credit. Meets 3 hours per week.**

Required of both day and evening students who do not show sufficient understanding of mathematics fundamentals, as determined by entrance examinations. Natural numbers, integers, rationals and irrationals, properties and operations in each, construction and solution of mathematical models using simple equations, and percentages.

**M 002. Mathematics Review II. No credit. Meets 3 hours per week.**

Prerequisite: M 001 or equivalent.

Continuation of M 001 offered to both day and evening students who do not show sufficient preparation for the standard course in college mathematics. Exponents, polynomials, rational functions, systems of equations, graphs, complex numbers, and quadratic equations.

**M 115. Mathematical Analysis I. Credit, 3 semester hours.**

Prerequisite: Entrance examination or satisfactory completion of M 002.

Cannot be taken for credit by mathematics, physical science, or engineering students.

Designed to offer the foundation needed for the study of calculus. Polynomials, algebraic functions, elementary point geometry, plane analytic trigonometry, and properties of exponential functions.

**M 115S. Mathematical Analysis I. Credit, 3 semester hours.**

Prerequisite: Entrance examination or satisfactory completion of M 002.

Cannot be taken for credit by mathematics, physical science, or engineering students.

Meets 5 times per week and is specially designed for engineering and other students going on to M 117. Topics covered include those of M 115 plus enough elementary analysis to permit entrance into M 117 and PH 108 concurrently.

**M 116. Mathematical Analysis II. Credit, 3 semester hours.**

Prerequisite: M 115.

Cannot be taken for credit by mathematics, physical science, or engineering students.

An intuitive approach to topics in functions, analytic geometry, differential and integral calculus, and probability. Designed for an insight into, and appreciation of, the methods of analysis.

**M 117. Calculus I. Credit, 3 semester hours.**

Prerequisite: M 115 or entrance examination.

The first-year college course for majors in mathematics, science, and engineering; and the basic prerequisite for all advanced mathematics. Introduces differential and integral calculus of functions of one variable, along with plane analytic geometry.

**M 118. Calculus II. Credit, 3 semester hours.**

Prerequisite: M 117.

Continuation of first-year calculus, including methods of integration, the fundamental integration theorem, differentiation and integration of transcendental functions, and varied applications.

**M 121-122. Algebraic Structures I and II. Credit, 6 semester hours.**

Prerequisite: Entrance examination.

A first course in abstract algebra: sets, mappings, operations, relations, elementary logic, number systems, and abstract systems.

**M 137. Calculus Theory. Credit, 3 semester hours.**

Prerequisite: Completion of 2 semesters of calculus at another school, but insufficient entrance examination score to start with M 203.

The theoretical material of the standard first year of calculus, including limits, chain rules, mean value theorems, and a discussion of the fundamental theorem of integral calculus. Upon successful completion, the student is qualified for M 203, Calculus III.

**M 203. Calculus III. Credit, 3 semester hours.**

Prerequisite: M 118.

The calculus of multiple variables, covering third dimensional topics in analytics, linear algebra, and vector analysis, plus partial differentiation, multiple integration, infinite series, and indeterminate forms.

**M 204. Differential Equations. Credit, 3 semester hours.**

Prerequisite: M 203.

The solution of ordinary differential equations, including the use of Laplace transforms. Existence of solutions, series solutions, matrix methods, non-linear equations, and varied applications.

**M 227-228. Finite Mathematics I and II. Credit, 6 semester hours.**

Prerequisite: M 116 or M 117.

Cannot be taken for credit by mathematics, physical science, or engineering students.

Matrix theory, linear programming, probability, and sets, with applications in the social and management sciences for computers.

**M 231. Linear Algebra. Credit, 3 semester hours.**

Prerequisite: M 203.

Matrices, linear systems, determinants, vector spaces, vector geometry, linear transformations, and quadratic forms.

**M 301. Linear Analysis. Credit, 3 semester hours. Alternates Day and Evening.**

Prerequisites: M 203 and M 231.

Vector spaces, infinite series, tensors, eigenvalue theory, transformations, unitary spaces, and an introduction to functional analysis.

**M 303. Advanced Calculus I. Credit, 3 semester hours.**

Prerequisite: M 204.

Topics covered from infinite series include convergence, tests for convergence, integration and differentiation, asymptotic expansions, and an introduction to real analysis concepts. Topics in complex variables include elementary functions, Cauchy-Riemann equations, Cauchy integral theorem, calculus of residues, integration, and conformal mapping.

**M 304. Advanced Calculus II. Credit, 3 semester hours. Offered every other year.**

Prerequisite: M 303.

Applied mathematics, including study of the Gamma and Beta functions, Laplace transforms, Legendre polynomials, Bessel functions, product solutions of partial differential equations, and boundary value problems.

**M 305. Series Solutions. Credit, 3 semester hours. Offered by demand.**

Prerequisite: M 204 and instructor's approval.

Considers series solutions of ordinary differential equations, including the hypergeometric type, Fourier analysis, introduction to perturbation methods, and successive approximation solutions of non-linear differential equations.

**M 309. Advanced Differential Equations. Credit, 3 semester hours. Offered every other year.**

Prerequisites: M 204 and M 231.

Theoretical analysis and applications of non-linear differential equations. Phase plane and space, perturbation theory and techniques, series and related methods, stability theory and techniques, and relaxation phenomena.

**M 321-322. Modern Algebra I and II. Credit, 6 semester hours.**

Prerequisites: M 122 and M 203.

Groups, rings, integral domains, fields, reals by Dedekind cuts, complex numbers, polynomials, vector spaces, linear transformations, and matrices.

**M 325. Number Theory. Credit, 3 semester hours. Offered every other year.**

Prerequisite: M 122 or M 118, and instructor's approval.

Topics are selected from the following: mathematical induction, Euclidean algorithm, integers, number theoretic functions, Euler-Fermat theorems, congruence, quadratic residues, and Peano axioms.

**M 338-339. Numerical Analysis I and II. Credit, 6 semester hours. Offered every other year.**

Prerequisite: M 204.

Approximation and error evaluation. Finite differences, approximation by polynomial and orthogonal series, solutions of ordinary differential equations, solutions of elliptic, parabolic, and hyperbolic partial differential equations, interpolation, and basic integral equation solutions.

**M 341. Sets and Ordered Structures. Credit, 3 semester hours. Offered every other year.**

Prerequisite: M 231.

Axiomatic set theory based on the Zermelo-Fraenkel theory, algebra of sets, relations and functions, finite and infinite sets, order, axiom of choice and its equivalents.

**M 343. Projective Geometry. Credit, 3 semester hours. Offered every other year.**

Prerequisites: M 203 and M 231.

Projective transformations, fixed points, invariants, cross-ratio, conics, Euclidean and non-Euclidean geometrics.

**M 345. Differential Geometry. Credit, 3 semester hours. Offered every other year.**

Prerequisites: M 204 and M 231.

Basic techniques of applied analysis as illustrated with geometry. Tensors, curvature, surface theory, covariant differentiation, Green's & Stoke's type theorems.

**M 371. Probability Theory. Credit, 3 semester hours. Alternates Day and Evening.**

Prerequisite: M 203.

Axiomatic study of probability: sample spaces, combinatorial analysis, independence and dependence, random variables, distribution functions, moment generating functions, central limit theorem.

**M 372. Mathematical Statistics. Credit, 3 semester hours. Offered every other year.**

Prerequisites: M 204 plus IE 346 and/or one mathematics course beyond M 204.

Fundamental topics in random variables plus central limit theorem, distribution-free problems, analysis of variance, and an introduction to multivariate distributions.

**M 411-412. Real Analysis I and II. Credit, 6 semester hours.**

Prerequisites: M 303 and M 322.

Foundations of analysis; sets and functions, limits, operations on sequences, continuous functions on metric spaces, differentiation, Riemann-Stieltjes integral, integration theory, and an introduction to measure theory and the Lebesque integral.

**M 423. Complex Variables. Credit, 3 semester hours. Offered every other year.**

Prerequisite: M 303.

For mathematics, science, and engineering students.

Review of elementary functions and Euler forms; plus holomorphic functions, Laurent series, singularities, calculus of residues, contour integration, maximum modulus theorem, bilinear and inverse transformations, conformal mapping, and analytic continuation.

**M 441. Topology. Credit, 3 semester hours. Offered every other year.**

Prerequisite: M 341.

Topics selected from the following: Hausdorff neighborhood relations, derived, open and closed sets, closure, topological space, bases, homeomorphisms, relative topology, product spaces, separation axioms, metric spaces, connectedness and compactness.

## Mechanical Engineering

**ME 101. Engineering Graphics. Credit, 3 semester hours.**

An introduction to the principles and techniques of graphical communication. Fundamentals of orthographic projections; sections; applied geometry; auxiliary views; analysis of point, line, and plane relationships; detail and assembly drawings of simple machine parts.

**ME 102. Engineering Drawing and Design. Credit, 3 semester hours.**

Prerequisite: ME 101.

For technical students and draftsmen, covering layout of assembly drawings; detailing of their parts, properly dimensioned, for interchangeable manufacture; use of A S A tables of metal fits for machine parts; use of threads and fasteners, with the use of tolerances and limits.

**ME 124. Mechanical Processes. Credit, 3 semester hours.**

Mill and manufacturing processes. The casting of metals, pattern making, and mold preparing. Fabricating, metal cutting, and welding. Demonstrations, laboratory, and inspection trips to local manufacturing plants.

**ME 201. Mechanics—Statics. Credit, 3 semester hours.**

Prerequisites: M 118 and PH 108.

The fundamental concepts of force systems in equilibrium. Distributed forces, flexible cables, friction, and an introduction to vector quantities as applied to two- and three-dimensional equilibrium problems.

**ME 202. Mechanics of Materials I. Credit, 3 semester hours.**

Prerequisite: ME 201.

Elastic behavior of structural elements under axial, flexural, and torsional loading. Lectures supplemented with laboratory exercises.

**ME 204. Mechanics—Dynamics. Credit, 3 semester hours.**

Prerequisites: ME 201 and M 203.

The elements of classical dynamics. The kinematics and dynamics of particles, and rigid bodies, inertial references systems, momentum, and energy methods.

**ME 301-302. Thermodynamics. Credit, 6 semester hours.**

Prerequisites: PH 210 and M 204.

The first and second laws of thermodynamics are developed from the fundamental concepts and energy transformations. Processes and cycles using ideal gases lead to the discussion of real gases and the two-phase system. The combustion and mixture of gases is amplified by the study of thermodynamic relations.

**ME 303. Steel Design and Construction. Credit, 3 semester hours.**

Prerequisites: M 203 and ME 202.

Analysis, design, and construction of steel structures. Design of frames, members, connections, and other related topics. Tension members, compression members, beams, girders, trusses, and rigid frames. Fabrication and erection, including shop practice.

**ME 304 Geology and Soil Mechanics. Credit, 3 semester hours.**

Prerequisites: M 203 and ME 202.

Structural composition of the earth's crust and the mechanics of its formation. Soil classifications and physical properties are related to the principles underlying the behavior of soils subjected to various loading conditions. Subsurface exploration and typical foundation problems are included.

**ME 307. Mechanics of Materials II. Credit, 3 semester hours.**

Prerequisite: ME 202.

Elastic and inelastic behavior of structural elements under combined loading. Strain energy method, contact stresses, compression members, ultimate strength, and composite design.

**ME 311. Machine Elements. Credit, 3 semester hours.**

Prerequisites: ME 307 and ME 343.

Analysis and design of machine elements to meet specified operating conditions. Stresses, deformations, and other factors in design of machine parts.

**ME 312. Mechanical Design. Credit, 3 semester hours.**

Prerequisite: ME 311.

Continuation of Machine Elements. Design projects selected individually and developed by the student.

**ME 314. Concrete Design and Construction. Credit, 3 semester hours.**

Prerequisites: M 204 and ME 307.

Analysis, design, and construction of both plain and reinforced concrete. Design, utilizing both working stress and ultimate strength techniques, of beams, slabs, columns, footings and retaining walls. Construction methods, including forming, reinforcing, concrete placing, and pre-casting will be described.

**ME 315. Mechanical Engineering Laboratory No. I. Credit, 2 semester hours.**

Open to Juniors in Mechanical Engineering only.

Students conduct selected tests in the field of mechanics and vibrations. Emphasis placed on organization of the experiment, measurement techniques, and sources of error. Students have the opportunity to design and execute one experiment of their own.

Note: Part-time students are charged for a standard 3 semester hour course.

**ME 318. Advanced Materials Processing. Credit, 3 semester hours.**

Prerequisites: ME 124 and ME 202.

Properties of materials. Forming, grinding, and cutting methods. Analysis of modern methods such as electrolytic grinding, high energy forming, and numerical control of machine tools.

**ME 321. Fluid Mechanics. Credit, 3 semester hours.**

Prerequisite: ME 204.

Fluid statics, ideal fluids, potential flow, circulation, dynamic action of fluids, real fluids, laminar and turbulent flow. Flow in pipes, open drain flow. Orifices, nozzles, and weirs. Boundary layer concepts. Dimensional analysis.

**ME 322. Gas Dynamics. Credit, 3 semester hours.**

Prerequisite: ME 321.

Compressible fluids, subsonic and supersonic flow. Air foils, vanes and blades. Lift and drag. Boundary layer in compressible flow. Shock waves.

**ME 335. Tool design. Credit, 3 semester hours.**

Prerequisites: ME 124 and ME 201.

Basic techniques of tool design, methods analysis, drill jig design, tolerances and allowances, cutting tools, die design, gauges, and fixtures.

**ME 336. Tool Engineering. Credit, 3 semester hours.**

Prerequisite: ME 335.

A continuation of ME 335 with emphasis on economics, estimating, and process planning. Group project entailing the complete planning and designing necessary to manufacture machine parts.

**ME 337. Heat power. Credit, 3 semester hours.**

Prerequisites: PH 210 and M 118.

Elementary thermodynamics for those students not studying mechanical engineering. The basic laws of thermodynamics are discussed with respect to the mass and energy transfers and transformations. Processes and cycles of fluids in closed and open systems provide insight into the study of power systems in general.

**ME 343. Mechanisms. Credit, 3 semester hours.**

Prerequisites: ME 204 and M 204.

Graphical and analytical methods for determining displacements, velocities, and accelerations of machine components such as linkage and cams. Application to simple mechanisms.

**ME 344. Mechanics of Vibration. Credit, 3 semester hours.**

Prerequisites: ME 202, ME 204, and M 204.

Presents and develops the mathematical relationships necessary for the solution of problems involving the vibration of lumped and continuous systems; damping; free and forced motion; resonance; isolation; energy methods; balancing; single, two and multiple degrees of freedom; vibration measurement.

**ME 401. Systems Analysis. Credit, 3 semester hours.**

Prerequisites: EE 224 ad ME 344.

The reduction of real systems to electrical and mechanical system circuit models; the analogous behavior of the mechanical and electrical components which make up these models, the response to impulse, exponential and harmonic excitations, transfer functions, stability and resonance, analog simulation and analog computer programming.

**ME 403. Propulsion Systems. Credit, 3 semester hours.**

Prerequisite: ME 302.

Power sources for use in propulsion are analyzed. From steam through the internal combustion engine and the gas turbine, the study reaches the advanced systems, the rockets, jets, and exotic engines. Emphasis upon the theoretical analysis of performance.

**ME 404. Heat transfer. Credit, 3 semester hours.**

Prerequisite: ME 302.

The primary types of heat transfer are conduction, convection, and radiation. The study of the types of heat transfer in transient and steady-state problems leads to solution of problems by analytical, graphical, and numerical methods. The effects can then be combined to analyze actual heat transfer problems encountered in practice.

**ME 405. Advanced Mechanical Design. Credit, 3 semester hours.**

Prerequisites: ME 312 and ME 321.

Selected and advanced topics related to the design of Machine Elements. Individual design projects developed by the student.

**ME 408. Advanced Dynamics. Credit, 3 semester hours.**

Prerequisites: ME 204 and M 301 or M 304.

Kinematics and dynamics of particles and systems of particles, Lagrange's equations. Central force motion. Hamilton's principle. The inertia tensor and rigid body motions.

**ME 415. Mechanical Engineering Laboratory No. 2. Credit, 2 semester hours.**

Open to Seniors in Mechanical Engineering only.

Various experiments to study problems in heat transfer, fluid flow, and energy conversion. Stress upon analysis of the problem and use of library sources to answer the statement of the problem. Where possible, an economic analysis will accompany the engineering solution.

Note: Part-time students are charged for a standard 3 semester hour course.

**ME 512. Senior Seminar. Credit, 3 semester hours.**

Open to Seniors in Mechanical Engineering only.

An independent design, theoretical analysis, or laboratory investigation in the field of the student's major interest. Subject to be approved by the chairman of the department, with the work accomplished under the guidance of a staff member.

## Metallurgy and Materials

**MT 123. Engineering Materials. Credit, 3 semester hours.**

The principal engineering materials of modern technology. Physical testing and the evaluation of tests; steels and non-ferrous alloys and their heat treatment; cement, concrete, wood, ceramics, and plastics. Gives engineers sufficient background in these materials to aid them in selecting and setting specifications. Laboratory sessions enable students to witness and perform mechanical tests, heat treatments, hardenability tests, and cold rolling and annealing operations.

**MT 219. Physical Metallurgy. Credit, 3 semester hours.**

Prerequisites: PH 209 and CH 105-106, which may be taken concurrently.

A basic understanding of the structure and properties of metals and chemical or physical processes by means of which such characteristics are modified. Discussions on metallurgical tests, equilibrium phase diagrams, heat treatment of ferrous and non-ferrous alloys, steel production, and hot and cold working of metals. Appropriate laboratory experiments included in addition to lectures. Gives the prospective engineer an acquaintance with metals fabrication and heat treatment.

**MT 220. Metallography. Credit, 3 semester hours.**

Prerequisite: MT 219.

Further understanding of physical metallurgy with emphasis on diffusion, precipitation hardening, solidification, heat treatment, and crystallography. Several lectures devoted to the preparation of metallurgical specimens for microscopic examination, the resulting microstructural appearance and its relation to properties. Lectures supplemented by laboratory work.

**MT 301. Welding Metallurgy. Credit, 3 semester hours.**

Prerequisite: MT 220.

Welding and brazing procedures for ferrous and non-ferrous alloys. Demonstrations and examinations of macro and microstructures of welded members. The following processes studied in detail: brazing, metal arc, inert atmosphere, atomic hydrogen, electron beam, laser, and resistance welding.

**MT 302. Rubber and Plastics Technology. Credit, 3 semester hours.**

Natural and synthetic rubbers, their production and fabrication with attention to vulcanizing, additives, and fillers. Tire manufacture discussed in detail. Thermoplastic and thermo-setting plastics reviewed in terms of chemistry, properties, and molding methods.

**MT 304. High Temperature Alloys. Credit, 3 semester hours.**

Elevated temperature behavior of alloys as well as associated tensile, creep, rupture, and fatigue testing. Ferritic and austenitic steels, nickel and cobalt base superalloys in terms of composition, structure, and strengthening mechanisms. Other alloy systems such as titanium, columbium, tantalum, chromium, molybdenum, and tungsten.

**MT 324. Nuclear Metallurgy. Credit, 3 semester hours.**

Prerequisites: MT 219 and PH 315.

Nuclear reactors, production and fabrication of uranium metal and alloys, metallurgy of zirconium, thorium, plutonium, beryllium, liquid metals used in nuclear reactors, fabrication of reactor components, non-destructive materials testing, and the radiation damage of materials.

**MT 331. Non-ferrous Metallurgy. Credit, 3 semester hours.**

Prerequisite: MT 220.

The physical metallurgy of aluminum, magnesium, copper, nickel, zinc, lead, tin and their alloys covered by lecture, discussion, and laboratory work. Melting, alloying, casting, extruding, rolling, drawing, and heat treating of the metals with emphasis on the efforts of variables and reasons therefor. Typical mill and service difficulties analyzed in the light of the specific fundamental principles involved.

**MT 342. Steels and Their Heat Treatment. Credit, 3 semester hours.**

Prerequisite: MT 220.

Fundamentals of ferrous physical metallurgy such as the iron-carbon phase diagram, time-temperature-transformation diagrams, hardenability, and the effects of alloying elements. Heat treating discussed in terms of resulting microstructures and physical properties. Practical applications include engineering steels, tool steels, and stainless steels, as well as the requirements of deep drawing, low carbon steel.

## Music

**MU 101. Introduction to Music. Credit, 3 semester hours.**

Some of the basic forms of music and styles of various composers. Music appreciation.

**MU 102. The Problems of Music. Credit, 3 semester hours.**

Musical aesthetics and its relationship to the composer and his works. The problem of music as an art form in the twentieth century. A continuation of MU 101.

**MU 105-106. Chorus. Credit, 1-8 semester hours; maximum per semester, 1 credit.**

Open to all students interested in group singing. Students with adequate scholastic standing may carry this course for credit in addition to a normal program. Two hours a week.

**MU 201. Music Analysis and History. Credit, 3 semester hours.**

The growth of Western music to 1850. Analysis of musical masterpieces on a technical and conceptual basis.

**MU 202. The Development of Contemporary Music. Credit, 3 semester hours.**

A continuation of MU 201, from 1850 to the present day. The medium of music as a structural and an emotional tool. Analysis of contemporary theories and compositions.

## Philosophy

**PHL 111. Introduction to Problems of Philosophy. Credit, 3 semester hours.**

Man's place in the universe, how we discover truth, the nature of beauty and the good, the basis of moral choices, etc.

**PHL 113. Introduction to the History of Philosophy. Credit, 3 semester hours.**

The chronological development of philosophical ideas from the Pre-Socratic thinkers to the twentieth century. Aristotle, St. Thomas, Spinoza, Kant, and others are studied in the context of their time.

**PHL 124. Logic and Scientific Method. Credit, 3 semester hours.**

Introduces the student to deduction, warranted induction, and scientific description.

**PHL 213. Contemporary Issues in Philosophy. Credit, 3-6 semester hours.**

Content varies with the interest of the instructor and the students. Current philosophical thinking in such areas as natural science, social science, metaphysics, religion, aesthetics, theory of knowledge, language, existentialism, ethics, and positivism.

**PHL 222. Ethics in a Changing Society. Credit, 3 semester hours.**

Prerequisite: PHL 111 or 113.

The major ethical systems in the framework of contemporary society. Ethical norms which point to goals of life and their relation to the issues in science, business, the professions, and other human activities.

**PHL 225. Symbolic Logic. Credit, 3 semester hours.**

Prerequisite: PHL 124 or M 121.

Formal deductive systems, including the propositional calculus, the calculus of functions, independence of axioms, primitive symbols, interpretation, paradoxes, theory of types, Goedel's theorem.

## Physical Education

**PE 111-112. Physical Education. No credit.**

Sports, rhythms, physical fitness tests, and exercises. Basic course required of all day freshmen who are not exempt because of similar experience in the Service or because of medical excuse.

**PE 113-114. Physical Education (women). No credit.**

Same as above.

**PE 221-222. Personal Hygiene. No credit.**

Required of all day freshmen who are exempt from PE 111-112 or PE 113-114. Personal aspects of hygiene, dealing with the principles of healthful living, mental attitude, diet, and the value of systematic exercise.

## Physics

**PH 108. Physics I w/Lab. Credit, 3 semester hours.**

Prerequisite: M 117 or instructor's approval.

Fundamental concepts and mathematical exposition, including calculus, of mechanics, statics, kinematics, Newton's laws, work, energy, power, conservation of energy and momentum, rotational concepts, simple harmonic motion.

Laboratory and Breakage Fee: $15.00.

**PH 201-202. General Physics w/Lab. Credit, 6 semester hours.**

Prerequisite: M 115 or equivalent.

Basic physics for students not majoring in science or engineering. Principles of mechanics, heat, energy, electricity, sound and light, without calculus. Students encouraged to examine the philosophy of physical science through outside reading and simple laboratory work.

Laboratory and Breakage Fee: $15.00 per semester.

**PH 209. Physics II w/Lab. Credit, 3 semester hours.**

Prerequisites: PH 108 or PH 202, M 118.

Fundamental concepts and mathematical exposition, including calculus, of electricity and magnetism, electrostatics, direct currents, magnetic effects of a current, electrical instruments, ballistic galvanometer, induced E.M.F., inductance and capacitance, simple harmonic motion, physical basis for A.C. circuits, bridge measurements, potentiometer measurements.

Laboratory and Breakage Fee: $15.00.

**PH 210. Physics III w/Lab. Credit, 3 semester hours.**

Prerequisite: PH 209.

Fundamental radiation topics include heat, sound, light; simple harmonic motion, generation of mathematical wave forms, wave propagation, laser demonstration of optical principles, lens systems, theory of color, wave interference, gratings, prisms, filters, spectroscopy.

Laboratory and Breakage Fee: $15.00.

**PH 211. Physics IV. Credit, 3 semester hours.**

Prerequisite: PH 210.

Modern physics fundamentals. Twentieth-century developments in physics. Special relativity, quantum theory of radiation, DeBroglie waves, the Bohr atom, elementary wave mechanics, the solid state, crystal structure, semiconductors, and lasers.

**PH 301. Analytical Mechanics. Credit, 3 semester hours.**

Prerequisites: M 204, PH 108, or instructor's approval.

Intermediate analytical mechanics. Statics and dynamics of particles and rigid body with emphasis on the theory of motion under central forces and on the use of the generalized coordinates; introduction to an elementary Lagrangian and Hamiltonian formalism; small vibrations.

**PH 315. Nuclear Physics. Credit, 3 semester hours.**

Prerequisite: PH 211 or instructor's approval.

Elementary nuclear physics. Nuclear structure, natural radioactivity, induced radioactivity, nuclear forces, and reactions, fission and fusion, reactors, and topics of special interest.

**PH 340. Lasers. Credit, 2 semester hours.**

Prerequisite: PH 210 or instructor's approval.

Laser theory, construction and application to latest engineering and scientific uses.

**PH 351-352. Intermediate Electricity and Magnetism. Credit, 6 semester hours.**

Prerequisites: PH 209 and M 204.

Electric field, potential, Gausse Law, dipoles, poissions, and LaPlace equations, dialectric theory, steady magnetic fields, electromagnetic induction, magnetic properties of matter, Maxwell equations, L-C-R circuits, A.C. circuit analysis, vacuum tube and transistor circuit theory.

**PH 361. Physical Optics. Credit, 3 semester hours.**

Prerequisites: PH 210.

Wave optics and the interaction of electromagnetic waves with matter. Fraunhofer and Fresnal diffraction, reflection and refraction of waves, polarization phenomena and coherent radiation.

**PH 371. Advanced Laboratory I. Credit, 2 semester hours.**

Prerequisite: PH 209.

Application of electrical and magnetic theory to ballistic galvanometer, cathode ray oscilloscope, current balance, oscillators, amplifiers, transistor and vacuum tube circuits, design of laboratory measuring equipment. Two 3-hour laboratory periods weekly.

**PH 372. Advanced Laboratory II. Credit, 2 semester hours.**

Prerequisite: PH 210.

Selected experiments in optics including lasers (construction and applications), interferometry and spectrometry.

**PH 373. Advanced Laboratory III. Credit, 2 semester hours.**

Prerequisite: PH 211.

Selected experiments in atomic and nuclear physics including nuclear radiation and decay, quantization of charge and light energy, and nuclear magnetic resonance.

**PH 400. Statistical Mechanics. Credit, 3 semester hours.**

Prerequisites: PH 301 and instructor's approval. PH 211, PH 452 or instructor's approval.

An introductory course in classical and quantum statistical mechanics. The canonical ensemble; Maxwell-Boltzmann, Bose-Einstein, and Fermi-Dirac statistics and their applications; statistical interpretation of thermodynamics; transport processes.

**PH 401. Atomic Physics. Credit, 3 semester hours.**

Prerequisite: PH 211.

Structure and interactions of atomic systems including Schrodinger's equation, atomic bonding, scattering and mean free path, radiative transitions, and laser theory.

**PH 404. Senior Project. Credit, 1-6 semester hours.**

Open only to senior Physics Majors. Individual projects in experimental or theoretical physics to be carried out under direct supervision of a faculty advisor.

**PH 406. Solid State Physics. Credit, 3 semester hours.**

Prerequisite: PH 211.

Elementary principles of the electrical behavior of solids as applied to semiconductors, metallurgy, and magnetically activated solid state devices.

**PH 451. Elementary Quantum Mechanics. Credit, 3 semester hours.**

Prerequisite: PH 211 and instructor's approval.

An elementary treatment of nonrelativistic quantum mechanics. Schrodinger's equation with its applications to atomic and nuclear structure; collision theory; radiation; introductory perturbation theory.

**PH 452. Thermodynamics. Credit, 3 semester hours.**

Prerequisite: PH 108 and instructor's approval.

An introduction to thermodynamics and kinetic theory. Laws of thermodynamics, entropy, application to simple physical and chemical systems; thermodynamic inequalities and equilibrium; phase transitions; properties of ideal gases; low temperature physics.

**PH 470. Theory of Relativity. Credit, 3 semester hours.**

Prerequisite: Instructor's approval.

Introductory course on Einstein's theory of relativity. Special theory of relativity including the Lorentz transformation, Minkowsky geometry, relativistic mechanics, and electromagnetism. General theory of relativity including principle of equivalence, Einstein's theory of gravitation, quantum theory of gravitation.

## Political Science

**PS 121. American Government. Credit, 3 semester hours.**

The structure and functions of the national government, party organization, national and state relations, and American politics as compared to those of other countries and the trends in modern politics.

**PS 122. State and Local Government. Credit, 3 semester hours.**

Prerequisite: PS 121.

The structure and functions of state and local governments in the United States.

**PS 216. Municipal Government. Credit, 3 semester hours.**

Prerequisite: PS 122.

Intensive study of selected problems of structure, organization, and powers of local government; intergovernmental relationships; administrative and personnel management; special application to Connecticut.

**PS 221. Introduction to International Relations. Credit, 3 semester hours.**

May be taken in place of PS 122.

Trends of contemporary international politics, the foreign policy process, selected substantive issues of foreign policy. The East-West confrontation, including a short history of the "cold war" and the current state of its major protagonists and their alliance systems. The "emerging countries," Western European integration, and the United Nations.

**PS 302. The U.S. Constitution. Credit, 3 semester hours.**

Prerequisite: PS 121.

Principles and concepts of the Constitution as revealed in leading decisions of courts. Concepts and principles of judicial review, federalism, separation of powers, implied powers, due process of law, equal protection, the contract clause, etc.

**PS 304. Political Parties. Credit, 3 semester hours.**

Prerequisite: PS 121.

An historical and functional analysis of American political parties, including a study of interest groups, public opinion, electoral devices, political leaders, and proposals for the reorganization of the existing party structure.

## Psychology

**P 111. Psychology. Credit, 3 semester hours.**

Important principles of human behavior. Motivation, emotion, learning, personality, intelligence, etc. The utilization of psychological knowledge in relation to everyday human activities.

**P 212. Business and Industrial Psychology. Credit, 3 semester hours.**

Prerequisite: P 111.

Psychological principles and research findings pertinent to administration in business and industry. Contemporary research of behavior factors in managerial contexts.

**P 321. Social Psychology. Credit, 3 semester hours.**

Prerequisites: P 111 and SS 113.

The interdependence of social organizations and behavior. The interrelationships between role systems and personality; attitude analysis, development and modification; group interaction analysis; social conformity; social class and human behavior.

## Public and Social Administration

**SA 211. Principles of Public Administration. Credit, 3 semester hours.**

Prerequisites: PS 121 and PS 122 or PS 216.

The development, organization, functions, and problems of national, state, and local administration.

**SA 301-302. Social Administration I and II. Credit, 6 semester hours.**

Prerequisites: SA 211 and SS 113.

Welfare legislation, counseling in social administration, criminology, fields of social work, introduction to public welfare, introduction to case work, sociology of minority relations, child welfare problems, juvenile delinquency, group dynamics, methods of social research, introductory social statistics, sociology of the family, sociology of industry, population problems, problems of an aging population, problems of redevelopment, and urban renewal.

**SA 400. Minority Group Relations. Credit, 3 semester hours.**

Prerequisites: SS 113 and PA 218.

An interdisciplinary survey of minority groups in this country with particular attention paid to those ethnic, religious, and racial factors that influence interaction. Designed to promote an understanding of sub-group cultures.

**SA 410. Urban Sociology. Credit, 3 semester hours.**

Prerequisite: SS 113.

The problems of the cities. Residential patterns together with the physical development of cities and redevelopment plans. An examination of groups of people and their environment and the relationship between the two.

**SA 501-502. Internship. Credit, 3 semester hours.**

Prerequisites or to be taken concurrently: SA 211 and SA 301-302.

Registration only by permission of the Director of Interns and the Department Chairman.

A seminar for Social Administration majors. A 10 hour weekly work program in conjunction with social agencies in the area. The student engages in actual field experience in the area of his major field of interest. The seminars provide guest speakers, discussions, and research possibilities.

## Science

**SC 111-112. Physical Science. Credit, 6 semester hours.**

Develops the student's appreciation of science and its relation to other areas of learning and to his daily living. Emphasis laid upon the development and unity of physical science as a field of knowledge. Subject material includes astronomy, physics, chemistry, meteorology and geology.

**SC 121-122. Biology. Credit, 6 semester hours.**

A survey of the members of the three biological kingdoms; the basic concepts of cellular structure and function. Comparison of the anatomy and physiology of representative members of the protist, the plant, and the animal kingdoms. Major emphasis placed on the human organism. Students introduced to each of the major subdivisions of biology.

**SC 131-132. Biology Laboratory. Credit, 2 semester hours.**

The microscopic examination of cells and tissues and the dissection of various organisms from the earthworm to the fetal pig.

Laboratory Fee: $15.00 per semester.

Note: Students who plan to take advanced courses in biology, or who are science majors, or who plan to transfer biology credits must take SC 131-132.

**SC 201. Genetics. Credit, 3 semester hours.**

Prerequisites: SC 122, SC 251, or SC 252.

Mendelian genetics and the major developments by the leaders in this field that have produced our modern concept of inheritance. Whenever possible the relationship of these theories to human genetics discussed. The role of DNA and the theories of the chemical basis of heredity.

**SC 202. Genetics Laboratory. Credit, 3 semester hours.**

Prerequisite: SC 201.

Classroom work of one meeting per week covers the theory and techniques of the laboratory experiments. The two laboratory sessions per week are entirely devoted to experimentation, using flies, yeasts, and bacteria to illustrate the classical theories of genetics.

Laboratory Fee: $15.00.

**SC 211-212. Human Anatomy & Physiology. Credit, 6 semester hours.**

Prerequisites: SC 122 and SC 132 or SC 251.

The essentials of human anatomy and physiology. Systems studied one at a time, taking up the anatomical features first and then the physiological functions. Both normal and pathological conditions discussed whenever possible.

**SC 251. Zoology w/Lab. Credit, 4 semester hours.**

Prerequisite: SC 122.

A comparative study made of the general morphology and physiology of the more important structures of animals from the amoeba to man, taken phylum by phylum. Evolution, ecology and inheritance. The laboratory work consists of dissecting representative animals from the major phyla, with special emphasis on the Phylum Cordata.

Laboratory Fee: $15.00.

**SC 252. Botany w/Lab. Credit, 4 semester hours.**

Prerequisites: SC 122 or SC 251 and SC 132.

The comparative structure, function, habitat, and evolutionary relationships of plants as well as the techniques of plant identification and classification. Field trips conducted when possible.

**SC 301. Microbiology w/Lab. Credit, 4 semester hours.**

Prerequisites: SC 251 and SC 252.

A history of microbiology and a survey of microbial life. Bacteria as characteristic prototypes of all microorganisms. These and the other microorganisms discussed, stressing their environment, growth, reproduction, metabolism, and relationship to man.

Laboratory Fee: $15.00.

**SC 302. Bacteriology w/Lab. Credit, 4 semester hours.**

Prerequisite: SC 301.

Theoretical and laboratory study of the morphology, physiology, and classification of bacteria and other microorganisms. The application of these facts to agriculture, industry, sanitation, public health, and disease.

Laboratory Fee: $15.00.

**SC 307. Comparative Vertebrate Anatomy w/Lab. Credit, 3 semester hours.**

Prerequisite: SC 251.

The structure, origin, and evolutionary history of the vertebrate organ systems. In the laboratory, representative species of each vertebrate class dissected, with attention given to the individual organ systems.

Laboratory Fee: $15.00.

**SC 321. Animal Ecology. Credit, 3 semester hours.**

Prerequisites: SC 251 and SC 252.

The interrelationships between animals, particularly man, and their biotic environment. Includes essentials of existence, food, reproduction, populations, communities, migration. distribution, succession, rhythms, adaptions, and applications.

**SC 411-412. Biochemistry w/Lab. Credit, 8 semester hours.**

Prerequisites: CH 301-302.

The structure and properties of compounds necessary for life's functions, and their interaction. In the laboratory, isolation and identification of biochemical compounds carried out and several types of enzyme reactions studied.

Laboratory Fee: $15.00 per semester.

## Sociology

**SS 113. Sociology. Credit, 3 semester hours.**

The role of culture in society, the person, and personality; groups and group behavior; institutions; social interaction and social change.

**SS 114. Problems in Sociology. Credit, 3 semester hours.**

Prerequisite: SS 113.

The major problems which confront the present social order, and the methods now in practice or being considered for dealing with these problems.

**SS 214. Contemporary Social Problems. Credit, 3 semester hours.**

Prerequisite: SS 113.

Sociological analysis as developed in Sociology 113 is applied to an overview of contemporary problems of the social order to find the many interconnections among these problems.

## Theater Arts

**T 131-132. Introduction to the Theater. Credit, 6 semester hours.**

The general patterns of the theater during the early Grecian period, the Elizabethan age, and the modern period. The theory of play production includes field trips to local theaters.

**T 141-142. Play Acting and Production. Credit, 6 semester hours.**

A general introduction to all phases of play production.

**T 341-342. Productions of the Professional Theater. Credit, 6 semester hours.**

History and function of the professional theater; problems of production and management. Theater resources of the New Haven area will be used as a laboratory. Students pay theater admission costs.

**T 491-492. Theater Arts Seminar. Credit, 6 semester hours.**

Independent studies in special theater productions; concentration on directing, acting, set designing, and lighting. Students will be under the direct supervision of professionals in the theater.

## Faculty—1967-1968

Allen, Thomas F., B.A., *Adjunct Special Lecturer, Social Sciences*

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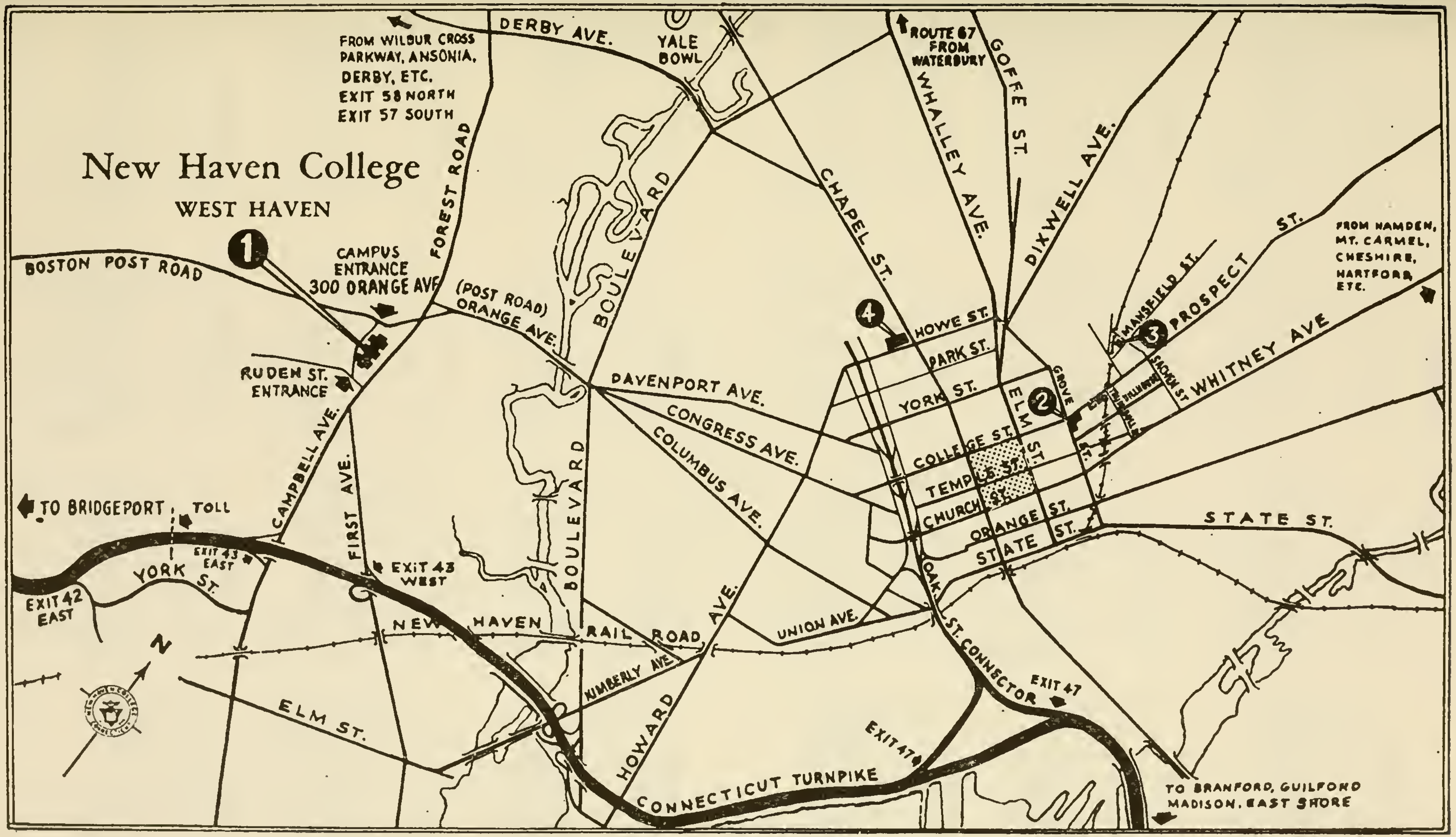

1. Main Campus, 300 Orange Avenue, West Haven
2. Strathcona Hall (Sheffield) (S), corner of Grove and Prospect Streets, N. H.
3. Hammond Laboratory (H), 14 Mansfield St., N. H.
4. YMCA, 52 Howe Street, N. H.

# CALENDAR FOR 1968

### JANUARY

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 | | | |

### FEBRUARY

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | | | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | | |

### MARCH

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | | | | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | | | | | | |

### APRIL

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | | | | |

### MAY

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | |

### JUNE

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | | | | | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | | | | | | |

### JULY

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 | | | |

### AUGUST

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | | | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |

### SEPTEMBER

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | | | | | |

### OCTOBER

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | 31 | | |

### NOVEMBER

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | | | | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |

### DECEMBER

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | | | | |

# CALENDAR FOR 1969

### JANUARY

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | |

### FEBRUARY

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | | | | | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | |

### MARCH

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | | | | | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | 31 | | | | | |

### APRIL

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | | | |

### MAY

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | | | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |

### JUNE

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | | | | | |

### JULY

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | 31 | | |

### AUGUST

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | | | | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | | | | | | |

### SEPTEMBER

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | | | | |

### OCTOBER

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | |

### NOVEMBER

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | | | | | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | | | | | | |

### DECEMBER

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 | | | |

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